

Sun Netra CT 900 Server

Installation Guide



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Using This Document

The *Sun Netra CT 900 Server Installation Guide* describes how to perform the initial installation of the Sun Netra CT 900 server from Oracle. Upon completion of the procedures in this document, your server will be functional.

The intended reader of this manual is an experienced system administrator who has experience installing hardware systems and components and has used the Oracle Solaris Operating System (Solaris OS). The reader should be comfortable with LAN fundamentals and with networking concepts in general.

Before performing the procedures described in this book, you should review the information in the *Sun Netra CT 900 Server Product Overview*.

Before You Read This Book

The *Sun Netra CT 900 Server Safety and Compliance Manual* specifies the environmental and electrical safety requirements for the product and contains compliance certification for various countries. Review the information in the *Sun Netra CT 900 Server Safety and Compliance Manual* before proceeding with the instructions in this document.

Using UNIX Commands

This document might not contain information on basic UNIX[®] commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Oracle Solaris Operating System documentation, which is at <http://docs.sun.com>

Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

Typographic Conventions

Typeface*	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% su Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm filename</code> .

* The settings on your browser might differ from these settings.

Related Documentation

The documents listed as online are available at:

<http://docs.sun.com/app/docs/prod/n900.srvr#hic>

Title	Part Number
<i>Sun Netra CT 900 Server Getting Started Guide</i>	819-1173
<i>Sun Netra CT 900 Server Overview</i>	819-1174
<i>Sun Netra CT 900 Server Installation Guide</i>	819-1175
<i>Sun Netra CT 900 Server Service Manual</i>	819-1176
<i>Sun Netra CT 900 Server Administration and Reference Manual</i>	819-1177
<i>Sun Netra CP3140 Switch Software Reference Manual</i>	819-3774
<i>Sun Netra CP3240 Switch Software Reference Manual</i>	820-3253
<i>Sun Netra CT 900 Server Safety and Compliance Guide</i>	819-1179
<i>Sun Netra CT 900 Server Product Notes</i>	819-1180
<i>Important Safety Information for Sun Hardware Systems</i>	821-1590

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These web sites provide additional resources:

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Sun Netra CT 900 Server Installation Guide, part number 819-1175-14

Overview of the Sun Netra CT 900 Server Installation

This chapter provides an overview of the tasks to install the Sun Netra CT 900 server. Detailed instructions for each task are provided on the pages specified.

Step	Task	Detailed Instructions
1.	Unpack your system.	Page 2-2
2.	Mount the shelf in a rack.	Page 2-14
3.	Make the DC power connections.	Page 2-28
4.	(Optional) Install additional cards.	Page 3-1
5.	Connect the cables to the shelf alarm panel.	Page 4-2
6.	Connect the cables to the switches.	Page 4-6
7.	Connect the cables to the node cards.	Page 4-14
8.	Install the operating system, if necessary.	Page 5-1

Installing the Shelf

This chapter describes the steps necessary to install and set up the Sun Netra CT 900 server (also referred to as the “shelf”). It includes instructions on unpacking, rackmounting, and making power connections.

This chapter includes the following topics:

- [Section 2.1, “Tools Required” on page 2-1](#)
- [Section 2.2, “Unpacking the System” on page 2-2](#)
- [Section 2.3, “Shipping Contents” on page 2-4](#)
- [Section 2.4, “Installing the Sun Netra CT 900 Server” on page 2-13](#)

Two versions of the Sun Netra CT 900 server are available: a 1GbE and a 10GbE version. For systems configured with Sun Netra CP3240 switches functioning as 10GbE switches, the 10GbE server is required.

2.1 Tools Required

You will need the following tools to install, remove, or replace most of the components in a Sun Netra CT 900 server:

- Screwdriver, Phillips No. 1
- Screwdriver, Phillips No. 2
- Socket wrench, 10mm hex
- Socket wrench, 7mm hex

2.2 Unpacking the System

Check the shipping carton for damage. If the shipping carton and contents are damaged, notify the carrier and Sun Microsystems for an insurance settlement. Retain the shipping carton and packing material for inspection by the carrier. Obtain authorization before returning any product to Sun Microsystems. Contact your local Sun Microsystems sales representative for more information.



Caution – Sun Microsystems has designed special packing material to protect the system during shipping. It is critical that you save the packing material. Shipping the unit without the original packing material might void the warranty. Replacement packing material can be purchased from Sun Microsystems.



Caution – This system contains board-level components that must be protected from static discharge and physical shock. Wear a wrist strap grounded through one of the system's ESD ground jacks when handling system components.

Following are the instructions for unpacking the Sun Netra CT 900 server:

1. Remove the straps that secure the box to the pallet.
2. Lift the top outer box straight up and away from the remaining packing materials.
3. Go to the rear of the Sun Netra CT 900 server and remove the cardboard divider from the box.
4. Remove the foam piece from the top of the Sun Netra CT 900 server.
5. Go to the front of the Sun Netra CT 900 server and lower the flap on the bottom piece of the box by pulling it down and away from the server.
6. Remove the foam packing material from the bottom front of the server.



Caution – You must use a mechanical lift to safely lift a Sun Netra CT 900 server into a rack. To prevent damage to the components, never use component handles or cables to lift or move the entire system.



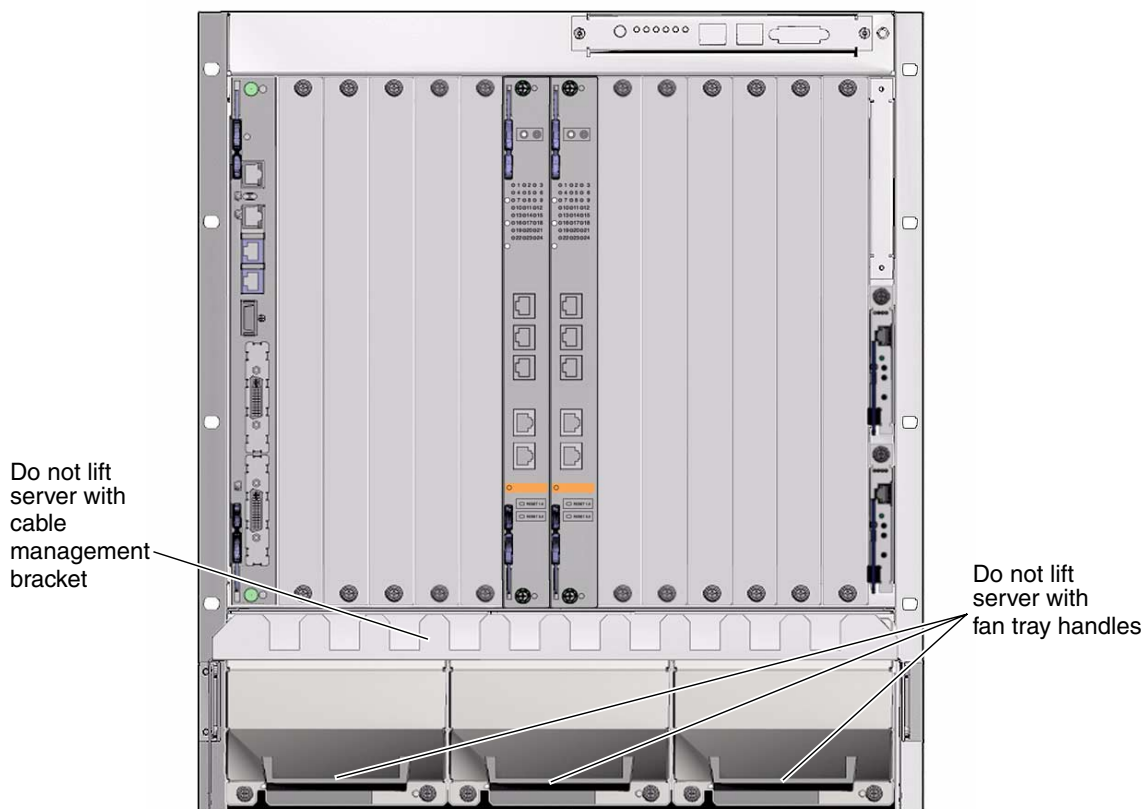
Caution – The edges at the bottom of the Sun Netra CT 900 server may be very sharp. Use extreme caution when lifting the Sun Netra CT 900 server from the bottom.

7. Position the mechanical lift in the area beneath the middle fan tray, then lift the server up and out of the box.



Caution – Do not use the fan tray handles or the cable management brackets as lifting points. Refer to [FIGURE 2-1](#) for the location of the fan tray handles and the cable management brackets.

FIGURE 2-1 Sun Netra CT 900 Server (Front)



2.3 Shipping Contents

The Sun Netra CT 900 server is shipped fully assembled and tested. The baseline configuration and most common options are listed in the following section. Your system might differ from the system described in this manual.

2.3.1 Basic Configuration

Following are the features of the Sun Netra CT 900 server:

- PICMG 3.0 Revision 2.0 compliant shelf
- Twelve 8U node board slots, supporting any combination of the following:
 - Up to twelve node boards based on SPARC® technology
 - Up to twelve x64-based node boards
 - Up to twelve AdvancedTCA® PICMG® 3.0 Rev. 2.0 compliant node boards
- Two 8U switch slots
- Two hot-swappable shelf management cards
- Efficient front-to-back and bottom-to-top cooling:
 - Up to 200W power and cooling for each node board and switch slot¹
 - Up to 25W power and cooling for each rear transition module
- Three hot-swappable fan trays for cooling
- Two hot-swappable, redundant -48 VDC power entry modules (PEMs)
- Quad power domain midplane, which isolates catastrophic power failures
- 10/100/1000BASE-T Base Fabric
- 1000BASE BX Extended Fabric, Dual Star topology
- Meets ETSI acoustic limits
- Can be configured for NEBS GR-63 acoustic requirements

[FIGURE 2-2](#) shows the components in a Sun Netra CT 900 server 1GbE chassis from the front, and [FIGURE 2-3](#) shows the components in a Sun Netra CT 900 server 1GbE chassis from the back. To use the next generation node boards and advanced rear transition modules in the 1GbE chassis, fan trays must be upgraded to provide adequate cooling. (Refer to the *Sun Netra CT 900 Server Upgrade Guide*, 820-3255).

1. The Sun Netra CT 900 server has additional capacity in power and cooling beyond 200W. However, exceeding the 200W limit may affect the performance, reliability, and compliance of the server.

FIGURE 2-4 shows the components in a Sun Netra CT 900 server 10GbE version from the front, and FIGURE 2-5 shows the components in a Sun Netra CT 900 server 10GbE version from the back. This chassis is designed for the next generation of switches, node boards, and advanced rear transition modules.

2.3.2 10GbE Configuration

In addition to the basic configuration, the 10GbE chassis has the following features, which support 10GbE switching, next generation node boards, and advanced rear transition modules (ARTMs).

- Higher capacity fan trays provide added airflow to node boards and RTMs
- Fan trays have new graphics for push-button and LED area
- Fan tray and PEM error LED has changed from red to amber fault indication
- Rear left and right mounting points added for earthquake/shipping enhancement
- Air path adjusted to filter dust from ARTM airstream
- Reduced SAP and PEM LED cross illumination to adjacent LED
- New graphics/label and screws on SAP (now you need only one screwdriver for servicing)
- Slot 14 zone 3 air block added to chassis
- All LED brightness increased 20% for improved visibility
- Rear grill changed to hex pattern to match front of system
- Inlet air plenum to rear fans at the bottom of the chassis
- Solid bottom sheet metal

FIGURE 2-2 Sun Netra CT 900 Server 1GbE Chassis Components (Front View)

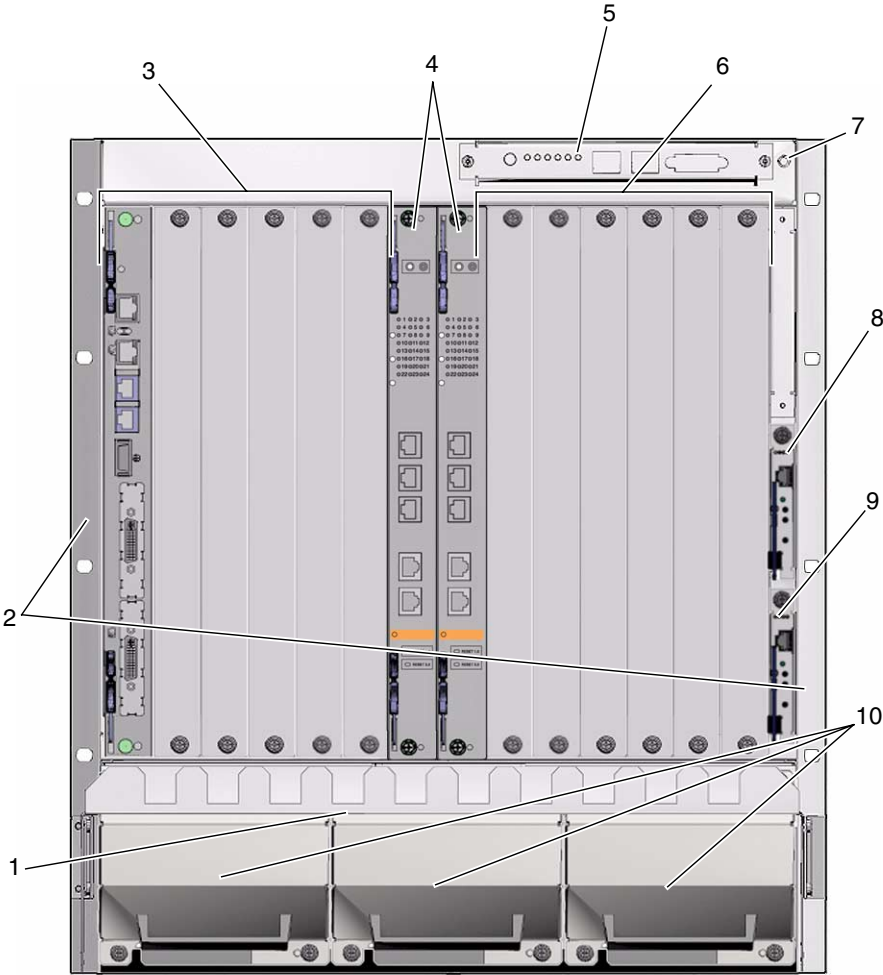


Figure Legend [FIGURE 2-2](#)

Callout	Description
1	Air filter (behind cable management bracket)
2	Rackmounting brackets
3	Node card slots (1-6)
4	Switch slots (7 and 8)

Figure Legend [FIGURE 2-2](#) (Continued)

Callout	Description
5	Shelf alarm panel
6	Node card slots (9-14)
7	ESD ground jack
8	Primary shelf management card
9	Backup shelf management card
10	Fan trays

FIGURE 2-3 Sun Netra CT 900 Server 1GbE Chassis Components (Back View)

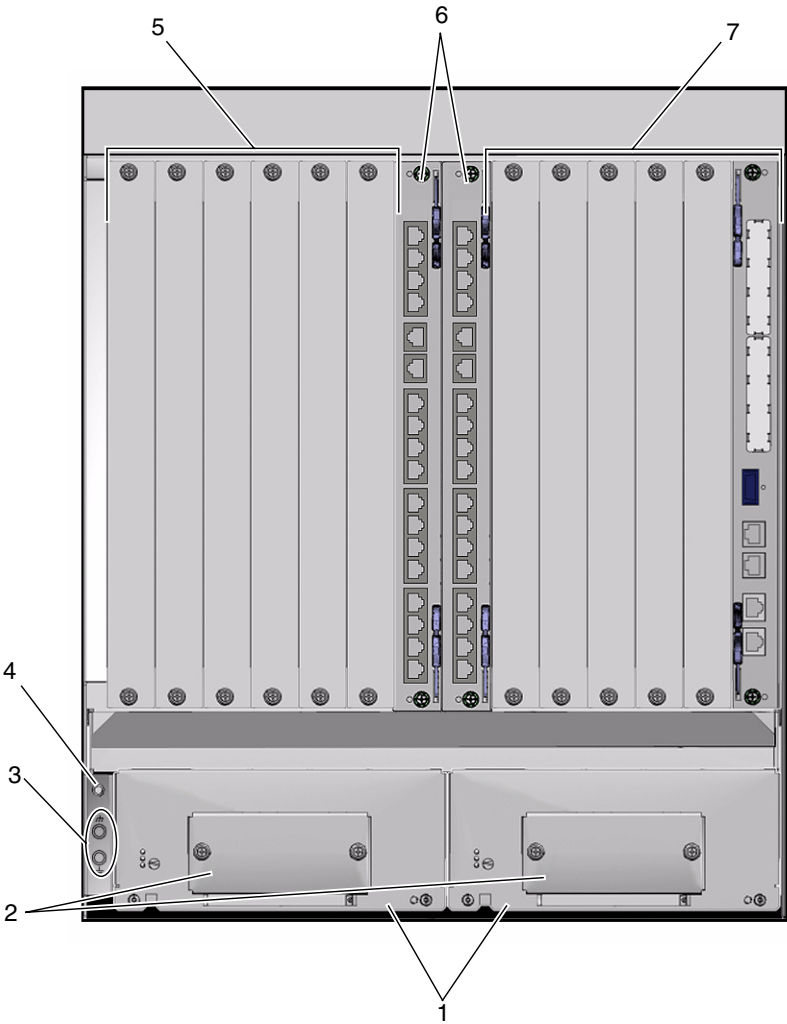


Figure Legend [FIGURE 2-3](#)

Callout	Description
1	Power entry modules
2	Power connectors (behind covers)
3	DC grounding lugs
4	ESD ground jack

Figure Legend **FIGURE 2-3** (Continued)

Callout	Description
5	Node rear transition module slots (9-14)
6	Switch rear transition module slots (7 and 8)
7	Node rear transition module slots (1-6)

FIGURE 2-4 Sun Netra CT 900 Server 10GbE Chassis Components (Front View)

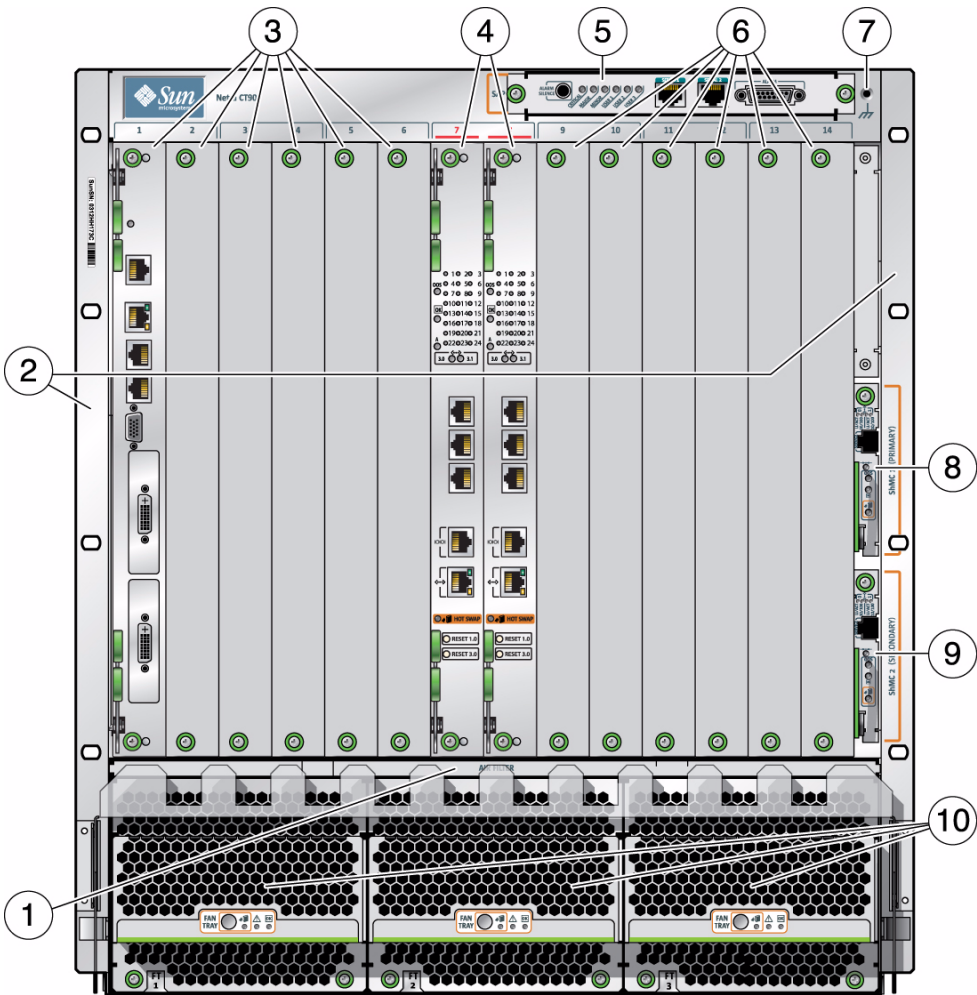


Figure Legend [FIGURE 2-4](#)

Callout	Description
1	Air filter (behind cable management tray)
2	Rackmounting flanges
3	Node card slots (1-6)
4	Switch slots (7 and 8)
5	Shelf alarm panel
6	Node card slots (9-14)
7	ESD ground jack
8	Primary shelf management card
9	Secondary shelf management card
10	Fan trays

FIGURE 2-5 Sun Netra CT 900 Server 10GbE Chassis Components (Back View)

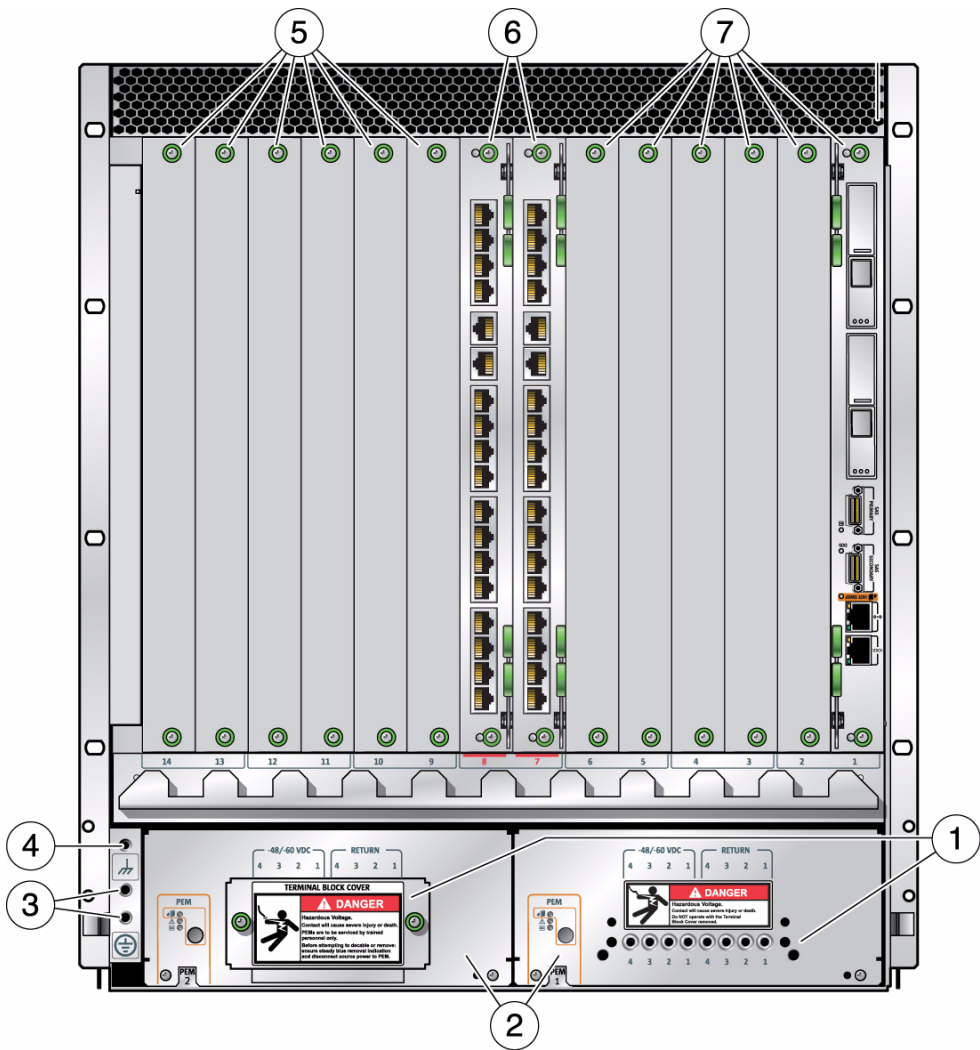


Figure Legend [FIGURE 2-5](#)

Callout	Description
1	Power entry modules (PEM)
2	Power connectors (behind covers)
3	Chassis grounding lugs

Figure Legend [FIGURE 2-5](#) *(Continued)*

Callout	Description
4	ESD ground jack
5	Node rear transition module slots (14-9)
6	Switch rear transition module slots (7 and 8)
7	Node rear transition module slots (6-1)

2.4 Installing the Sun Netra CT 900 Server

Note – Static electricity can harm delicate components inside the Sun Netra CT 900 server. To protect system components from static shock when handling them, wear a wrist strap plugged into an ESD ground jack. ESD ground jacks are located at the front and rear of the system. See [FIGURE 2-2](#) and [FIGURE 2-3](#) for the location of the ESD ground jacks. The ESD ground jacks will provide adequate static protection only if the server is grounded to a building ground, the server is installed in a grounded rack, or the server is sitting on a properly installed static mat.

Before installing and using the Sun Netra CT 900 server, ensure that all cover panels are in place and that all component slots are populated with a component or covered with a blank filler panel.



Caution – Failure to cover open slots could cause overheating of boards or other components, and could damage the system.



Caution – You must use a mechanical lift to safely lift a Sun Netra CT 900 server into a rack. To prevent damage to the components, never use component handles or cables to lift or move the entire system.



Caution – The edges at the bottom of the Sun Netra CT 900 server may be very sharp. Use extreme caution when lifting the Sun Netra CT 900 server from the bottom.

Be sure to mount the system in a way that ensures even weight distribution in the rack. Uneven mechanical loading can result in a hazardous condition. Secure all mounting bolts when installing the enclosure to the frame or rack.

Install the system in an environment compatible with the recommended maximum ambient temperature. Due to the modular design of the system, components might be installed that alter the system's operating requirements. Refer to the system specifications in the *Sun Netra CT 900 Server Service Manual* for the maximum recommended ambient temperature for the Sun Netra CT 900 server, and to product-specific documentation for the maximum recommended ambient temperature for individual components.

2.4.1 Choosing a Rackmount Kit

Use [TABLE 2-1](#) and [FIGURE 2-6](#) to determine the rackmount kit for your chassis.

TABLE 2-1 Rack Frame Dimensions and Supporting Rackmount Kits

Your Rack Frame Dimensions and Mounting Surface			Rackmount Kit to Order		
Width	Depth	Mounting Surface	Description	X-option	Part Number
482.2 mm (18.984 in)	677.4 mm (26.669 in)	Parallel to front of frame	19", Sun NGR, Rackmount kit	X4023A	594-2575-01
498.0 mm (19.606 in)	395.0 mm (15.551 in)	Parallel to side of frame	19", STD-Schroff, Rack Mount	X4020A	594-2576-01
526.6 mm 20.732 in)	395.0 mm (15.551 in)	Parallel to side of frame	600 mm, ETSI, Rackmount kit	X4022A	594-2577-01
> 465.1 mm (18.311 in)	> 434.04 mm (17.088 in)	Bottom shelf slide mount	No standard kit available. Note: Uses front flange for mounting and 10-32 chassis bottom inserts. Bottom and slide mounting are available for customer integration.		

FIGURE 2-6 Front Mounting and Side Mounting Options

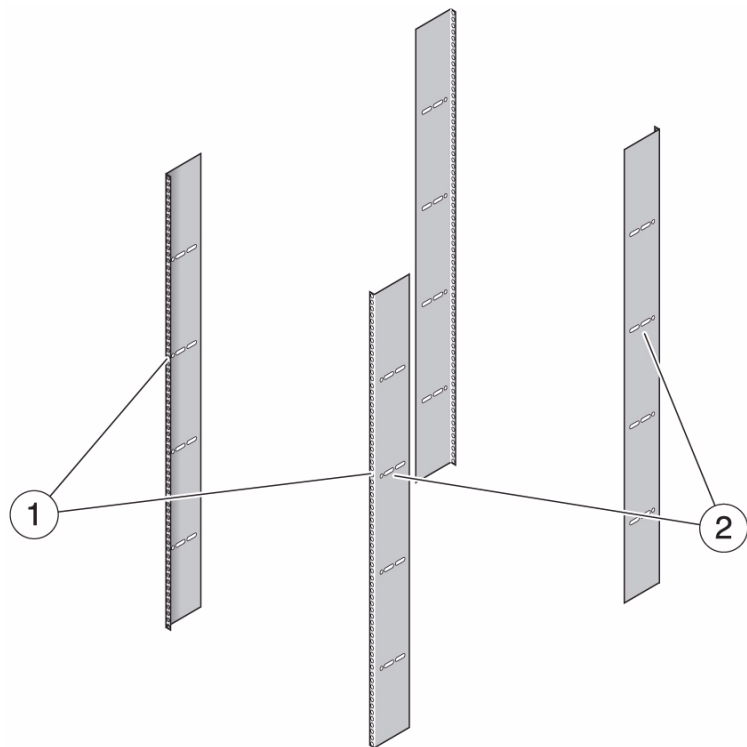


Figure Legend [FIGURE 2-6](#)

Callout	Description
1	Front mounting (parallel to the front rails): The screws that attach the shelf to the rack are installed from the front of the rack.
2	Side mounting (parallel to the side rails): The screws that attach the shelf to the rack are installed from the side of the rack.

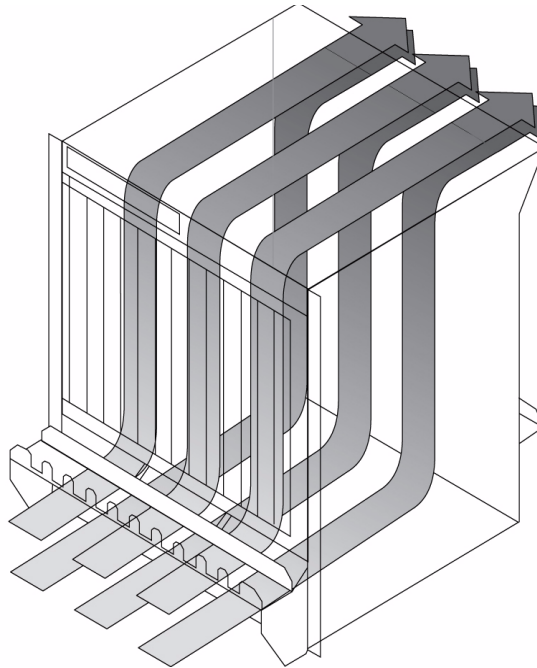
2.4.2 Rackmounting the System

1. **Disconnect all power sources, external connections, and cables prior to installing the system into a rack.**
2. **Remove the rackmount tray from the ship kit.**
3. **Select a position in the rack that does not interfere with other equipment and that provides safe weight distribution.**

Ensure that the area around the Sun Netra CT 900 server's intake and exhaust vents will be clear of obstructions for efficient cooling. [FIGURE 2-7](#) shows the proper airflow for the Sun Netra CT 900 server.

4. **Go to the appropriate rackmount installation instructions for the your rackmount kit.**
 - ["Installation Using 19 Inch NGR Rackmount Kit X4023A" on page 2-17](#)
 - ["Installation Using 19 Inch STD Rackmount Kit X4022A" on page 2-19](#)
 - ["Installation Using 600MM Rackmount Kit X4023A" on page 2-22](#)

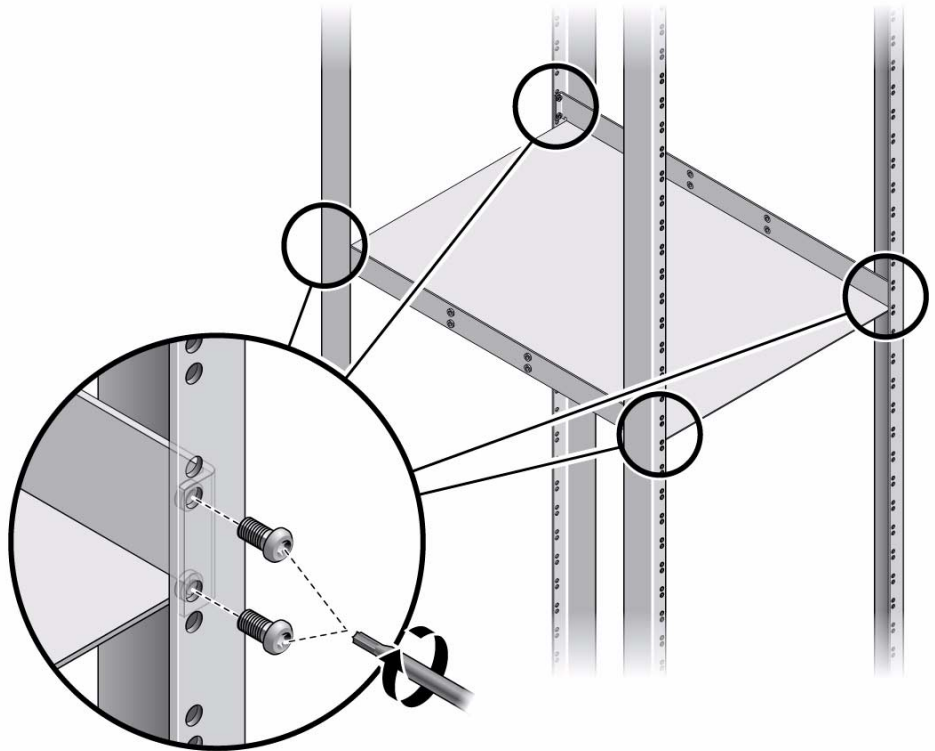
FIGURE 2-7 Airflow Diagram



2.4.2.1 Installation Using 19 Inch NGR Rackmount Kit X4023A

1. Place the rackmount tray in its intended location and bolt the tray to the front and rear of the rack using eight M5 screws (FIGURE 2-8).

FIGURE 2-8 Mounting the Rackmount Tray Using Rackmount Kit X4023A

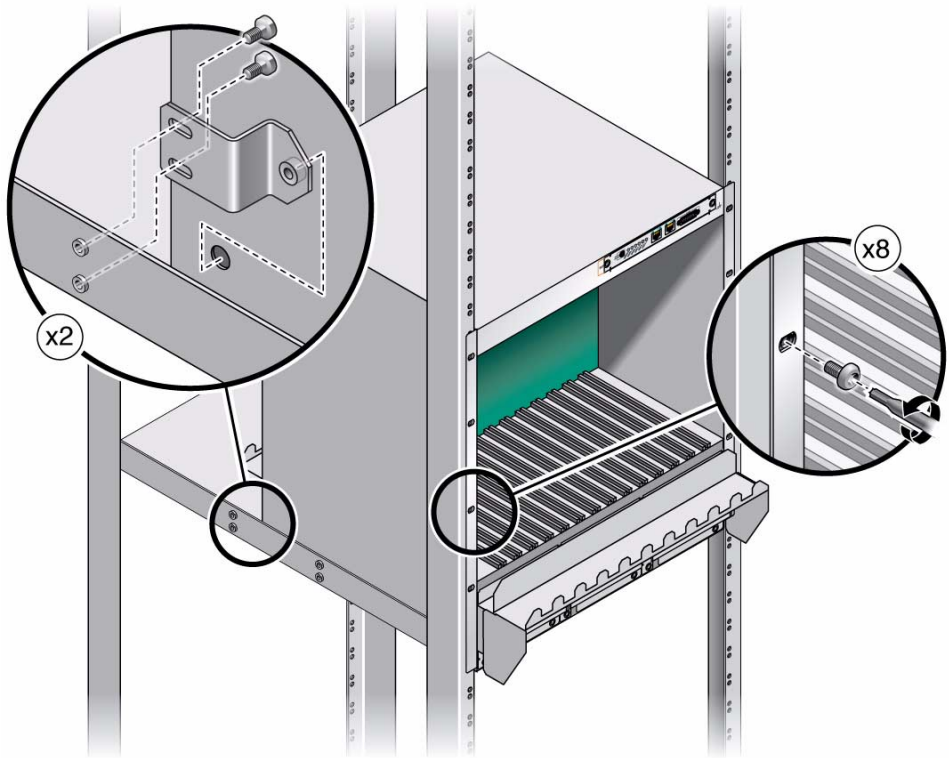


2. Using the mechanical lift, place the Sun Netra CT 900 server on the tray.
3. Bolt the front left and right flanges of the ATCA shelf with eight screws to the front columns (FIGURE 2-9).

Note – Rack hardware is not included.

4. Insert the locating bushings of the rear mounting brackets into the holes at the rear lower side of the ATCA shelf (FIGURE 2-9).
5. Bolt the rear mounting brackets with M6 screws to the rackmount tray (FIGURE 2-9).

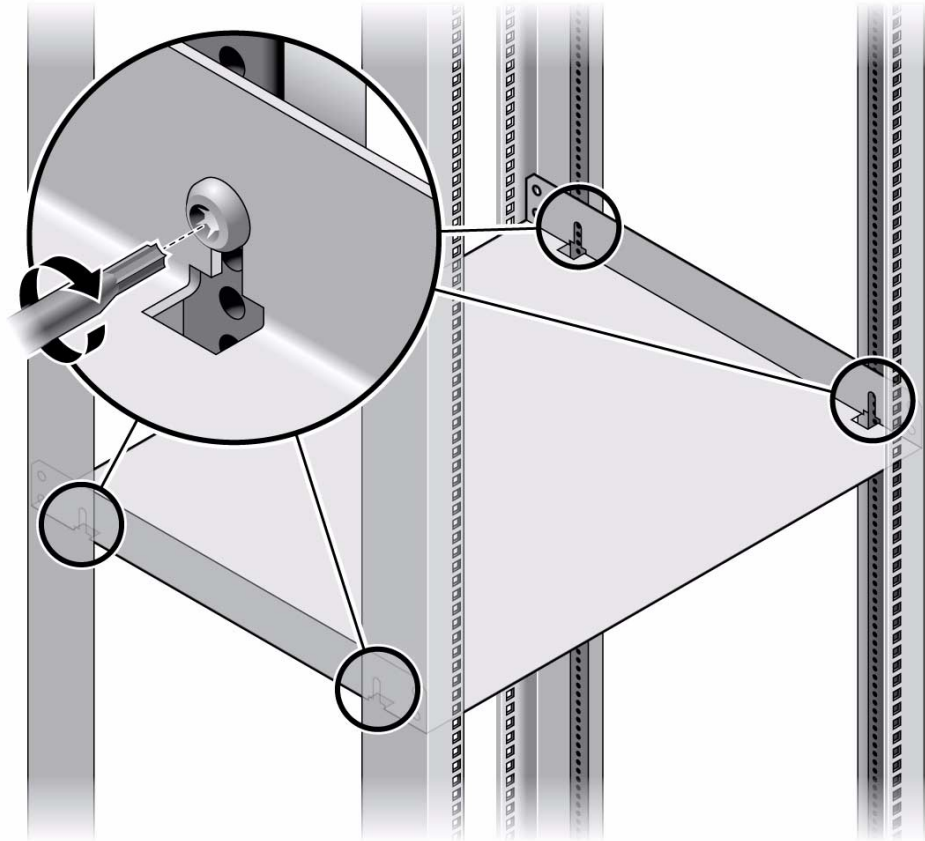
FIGURE 2-9 Installing the ATCA Shelf in the Rack Using Rackmount Kit X4023A



2.4.2.2 Installation Using 19 Inch STD Rackmount Kit X4022A

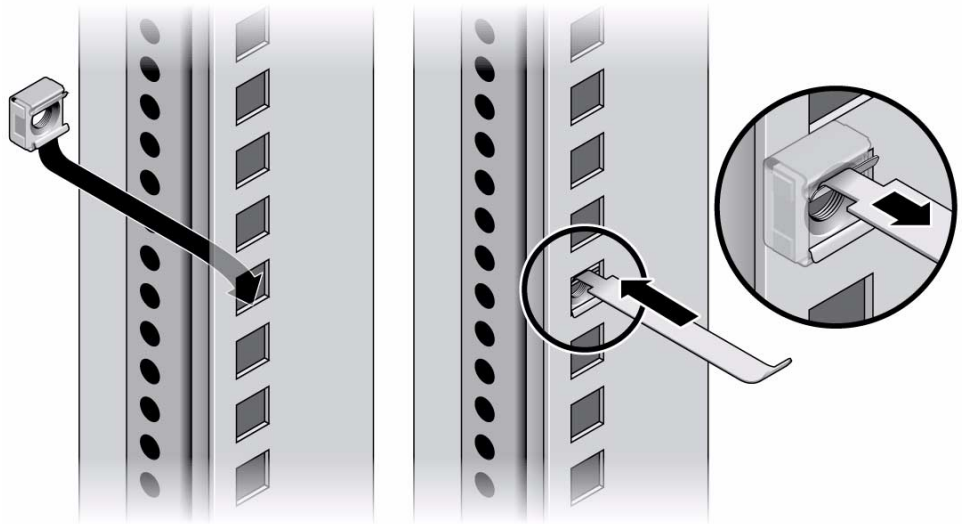
1. Place the rackmount tray in its intended location and bolt the tray with four thread-forming screws to the front and rear columns of the rack ([FIGURE 2-10](#)).

FIGURE 2-10 Mounting the Rackmount Tray Into the Rack Using Rackmount Kit X4022A



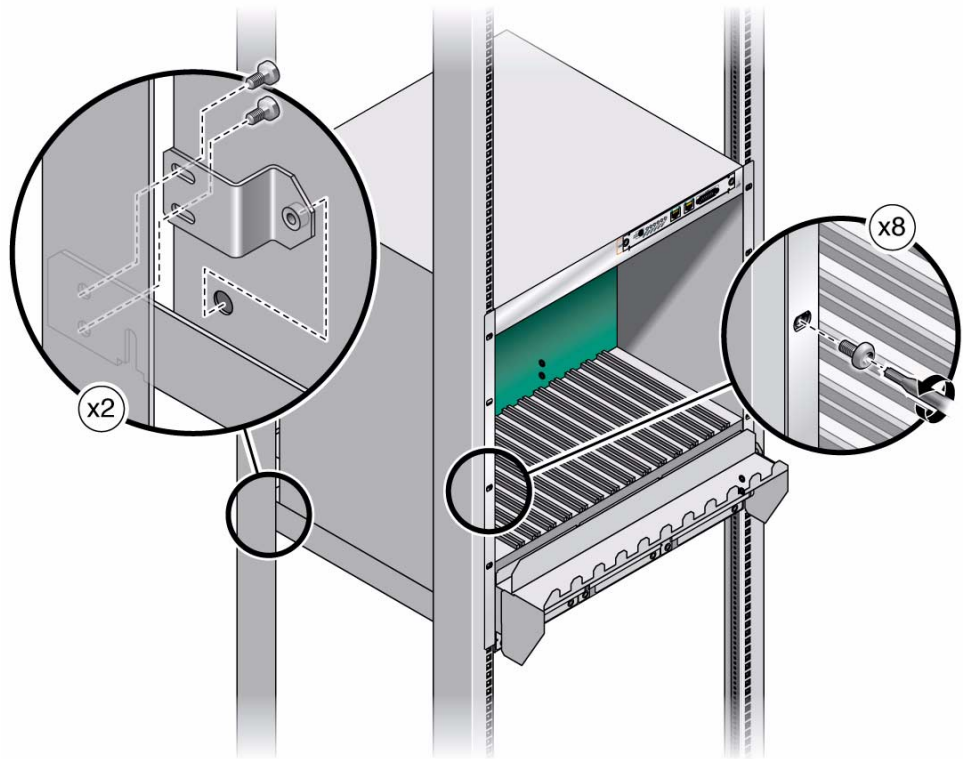
2. Determine the mounting holes for the M6 cage nuts in the front columns.
3. Attach four M6 cage nuts to each front rack column using the insertion tool ([FIGURE 2-11](#)).

FIGURE 2-11 Attaching the Cage Nuts for the Rackmount Kit X4022A.



4. Using the mechanical lift, place the Sun Netra CT 900 server on the rackmount tray.
5. Insert the locating bushings of the rear mounting brackets into the holes at the rear lower side of the ATCA shelf (FIGURE 2-12).
6. Bolt the front mounting brackets of the ATCA shelf with eight M6 screws to the front columns (FIGURE 2-12).

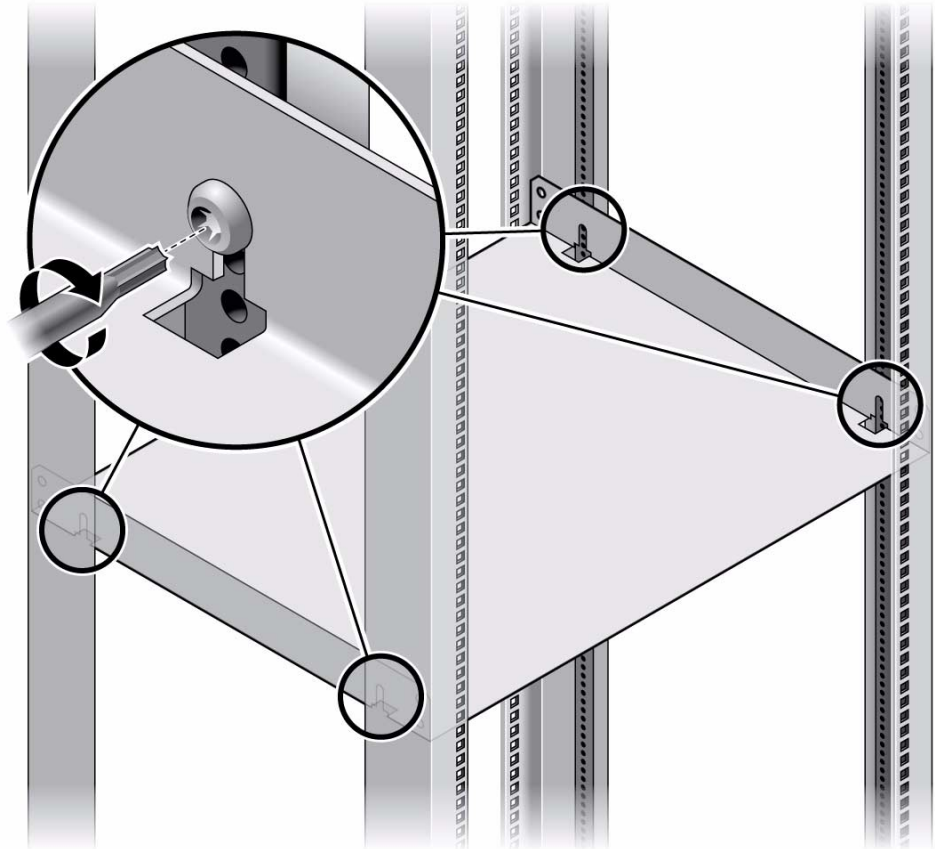
FIGURE 2-12 Installing the ATCA Shelf in the Rack Using the Rackmount Kit X4022A



2.4.2.3 Installation Using 600MM Rackmount Kit X4023A

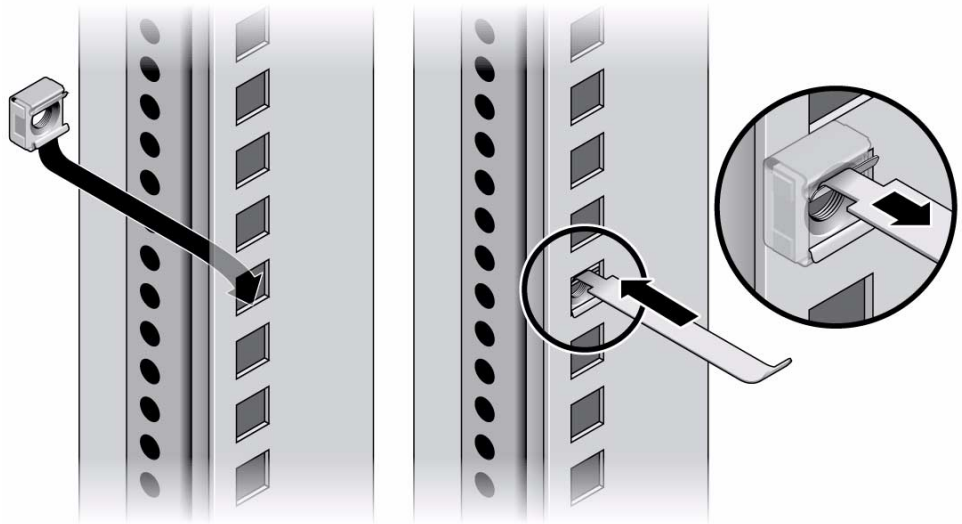
1. Place the rackmount tray in its intended location and bolt the tray with four thread-forming screws to the front and rear columns of the rack ([FIGURE 2-13](#)).

FIGURE 2-13 Mounting the Rackmount Tray Into the Rack Using Rackmount Kit X4023A



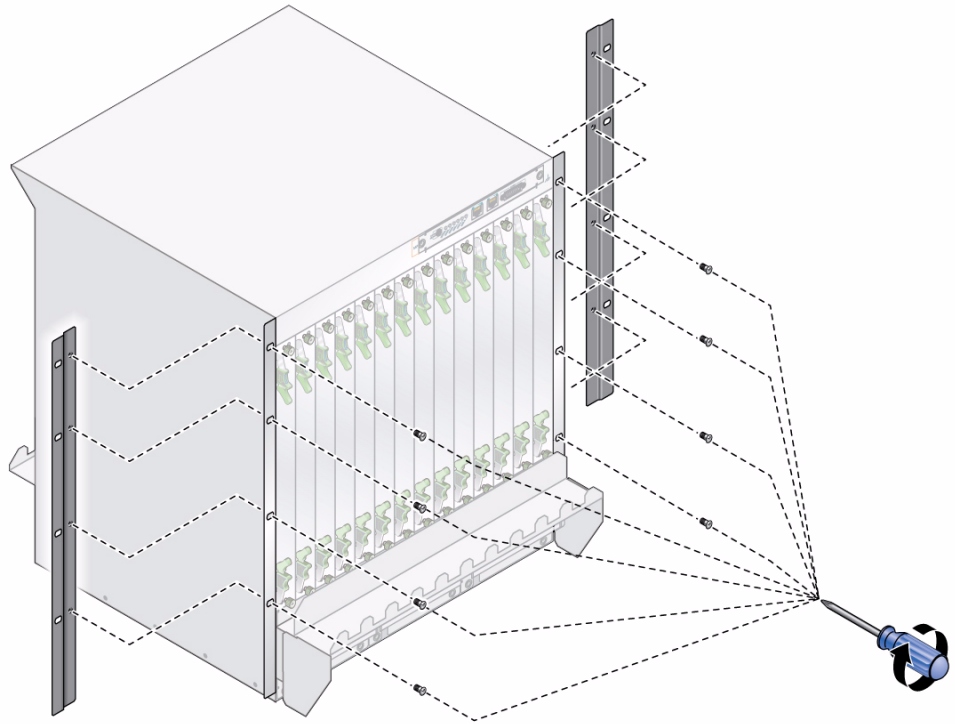
2. Determine the mounting holes for the M6 cage nuts in the front columns.
3. Attach four M6 cage nuts to each front rack column using the insertion tool ([FIGURE 2-14](#)).

FIGURE 2-14 Attaching the Cage Nuts for the Rackmount Kit X4023A.



4. Using the mechanical lift, place the Sun Netra CT 900 server on the rackmount tray.
5. Bolt the extension flange to the front mounting brackets of the ATCA shelf with eight M6 screws, 4 screws on each side ([FIGURE 2-15](#)).
6. Bolt the extension flanges on the ATCA shelf to the front columns with eight M6 screws, 4 screws on each side.

FIGURE 2-15 Installing the ATCA Shelf in the Rack Using the Rackmount Kit X4023A



2.4.3 Bottom Shelf Slide-Mounting

Bottom shelf slide mounts can be used for sliding the Sun Netra CT 900 server in and out of the bottom shelf of the rack. There are no rackmount kits available for this type of mounting but threaded inserts are provided on the bottom of the chassis. These mounting points can be used for attaching U-channels that are capable of supporting the server. The threaded mounting points as shown in [\(FIGURE 2-16.\)](#)

FIGURE 2-16 Mounting Points on Bottom of Chassis for Slide-Mount Installation

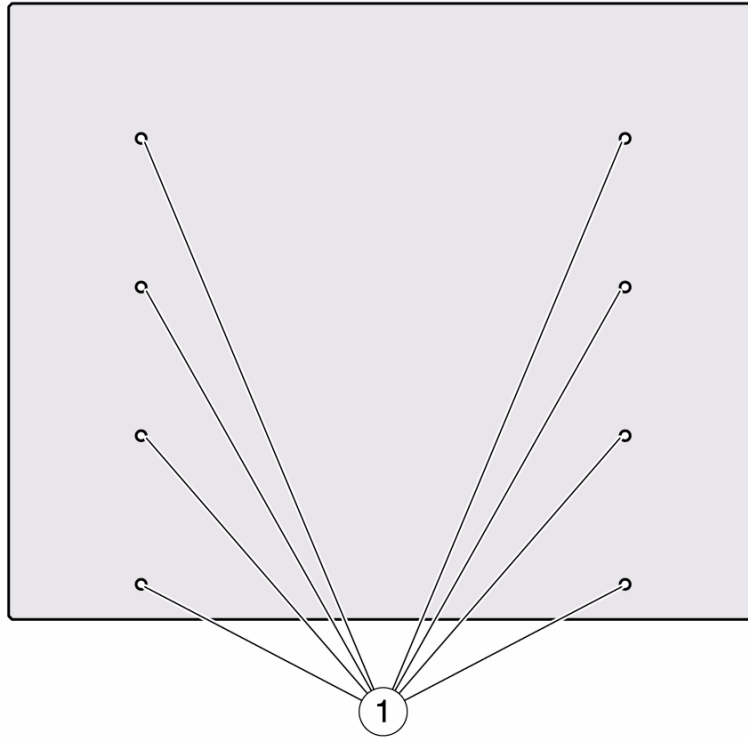


Figure Legend [FIGURE 2-16](#)

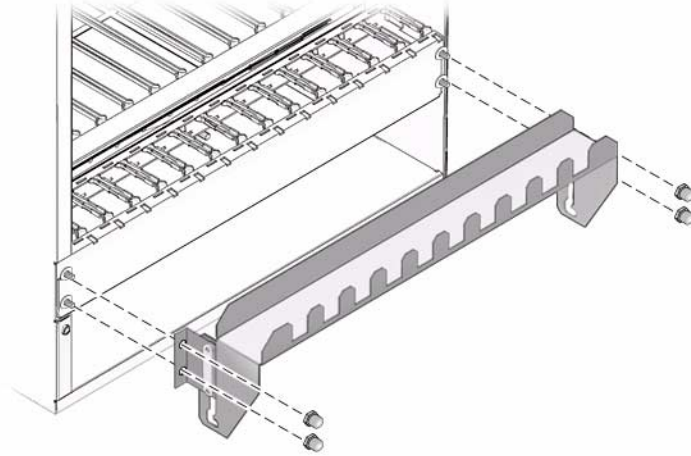
1 Mounting points for slide mounts

2.4.4 Removing the Front Cable Management Bracket, If Necessary

You can remove the front cable management bracket if you find that the bracket interferes with the front doors on the rack.

1. **Go to the front of the Sun Netra CT 900 server and locate the front cable management bracket.**
2. **Using the 7mm socket wrench, remove the four nuts (two on each side) that secure the front cable management bracket to the Sun Netra CT 900 server ([FIGURE 2-17](#)).**

FIGURE 2-17 Removing the Front Cable Management Bracket



3. Remove the front cable management bracket from the Sun Netra CT 900 server and store it in a safe place.

2.4.5 Connecting the DC Grounding Cable

In a typical telco environment, the VRTN path of the -48V supply is grounded to the protective earth (PE) of the building.

Following are the specifications for the DC grounding cable:

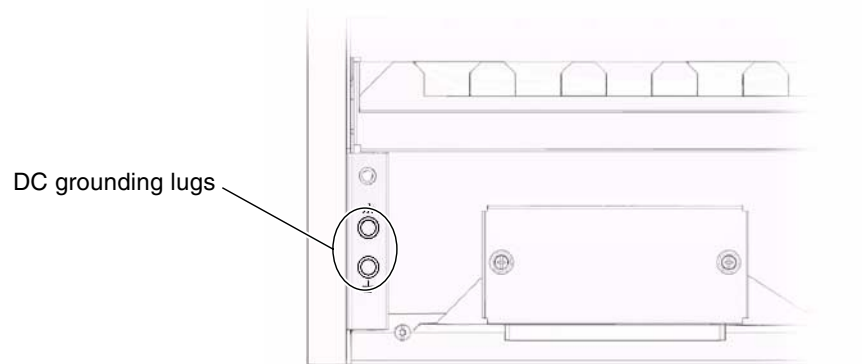
- Required wire size—AWG6
- Required terminals—Only double lug terminals with 45-degree angle tongue



Caution – The shelf is intended to be grounded. Make sure that the DC grounding lugs are connected to the protective earth (PE) of the building before powering up the shelf.

1. Get a DC grounding cable and two M5 nuts with star washers.
2. Go to the back of the chassis and locate the two DC grounding lugs (FIGURE 2-18).

FIGURE 2-18 Locating the DC Grounding Lugs



3. Remove the plastic shielding from the DC grounding lugs.
4. Align the DC grounding cable against the two DC grounding lugs at the rear of the chassis.
5. Place the star washers between the DC grounding cable and the two M5 nuts that you will use to secure one end of the grounding cable to the two lugs.
6. Tighten the two M5 nuts to secure the grounding cable to the two lugs.
7. Secure the other end of the grounding cable to the earth ground in the building.
You can secure the grounding cable to a proper grounding point on the rack, as long as the rack is properly grounded to the earth ground in the building.

2.4.6 Providing Power

The power input panel configuration must match the voltage input configuration of the power entry modules intended for use with the system.

The Sun Netra CT 900 server must be connected to properly rated supplies. For permanently connected equipment, a readily accessible disconnect device should be incorporated in the building wiring installation. Circuit breakers should be rated to handle the current indicated in the input specifications listed on the product identification label at the rear of the Sun Netra CT 900 server.

Each power entry module has four power feeds going into the system. [FIGURE 2-19](#) shows the proper connections for the -48V and VRTN power going into the four feeds for each power entry module.

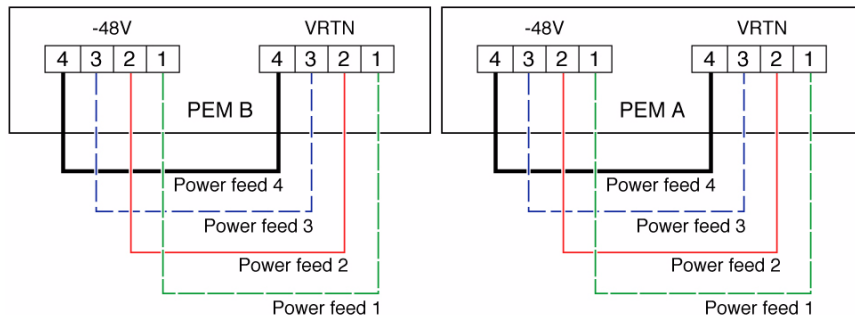
Refer to the *Sun Netra CT 900 Server Product Overview* for more information about how power is distributed through the Sun Netra CT 900 server and how to calculate power requirements.

Note – You must connect power to all four power feeds in at least one of the two power entry modules to power up to all the major components in the Sun Netra CT 900 server. Certain components will not power up if do not connect power to all four power feeds in at least one power entry module. Refer to the *Sun Netra CT 900 Server Product Overview* for more information about the components that receive power from each of the four power feeds. For power redundancy, you must connect power to all four power feeds to both power entry modules, and the feeds to each power entry module should come from separate sources.



Caution – Always ensure that the system is properly grounded before applying power. When the system is plugged in, energy hazards are present on the midplane. Do not reach into the enclosure.

FIGURE 2-19 Power Feeds Going Into the Power Entry Modules



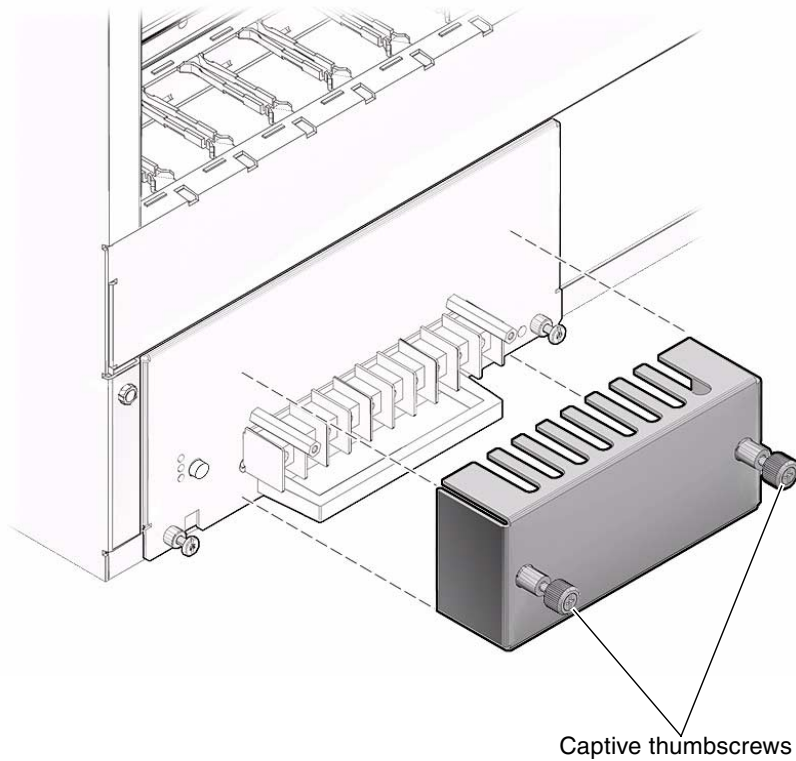
2.4.6.1 Connecting DC Power



Caution – Before working on the Sun Netra CT 900 server, you must disconnect power from the DC power sources. When the Sun Netra CT 900 server is powered on, do not touch the power terminals.

1. Disconnect power from the DC power sources.
2. Go to the rear of the shelf and loosen the two captive thumbscrews that secure the terminal block cover over each power entry module (FIGURE 2-20).

FIGURE 2-20 Location of the Captive Thumbscrews



3. Remove the terminal block covers from the rear of the shelf.



Caution – The Sun Netra CT 900 server is intended for connection to DC power sources that have power line transient protection equivalent to that provided for TNV-2 class circuits as defined by standards UL 60950 and IEC60950.

4. Attach the cables to the appropriate terminal posts on each power entry module (FIGURE 2-21).

Keep the following restrictions in mind when connecting the DC power source to the Sun Netra CT 900 server:

- Restrict the connection of the Sun Netra CT 900 server to the DC power source to minimize the possibility that transient energy will appear on the main input to the equipment. The DC battery power source must be in the same premises as the Sun Netra CT 900 server. The Sun Netra CT 900 server cannot be in one building with the power source in another building.
- Verify that the cables meet the following requirements:

- Diameter of 6 mm² resp. AWG10.
- Maximum length of 2.5 to 3 meters.
- Suitable for 28A at 50 degrees C ambient temperature.
- Use ring terminals for screws M3.5. The maximum outside diameter is 9.5 mm.
- The system input rating is 28A for each of the four power feeds (120A total). Keep this in mind when planning for the power source and breakers to keep from tripping the breakers.
- To provide DC input power redundancy, connect both the PEM A and B inputs to different redundant power sources. Refer to the *Sun Netra CT 900 Server Product Overview* for more information about DC input power redundancy and the power distribution model for the Sun Netra CT 900 server.

FIGURE 2-21 Power Entry Module Terminal Posts

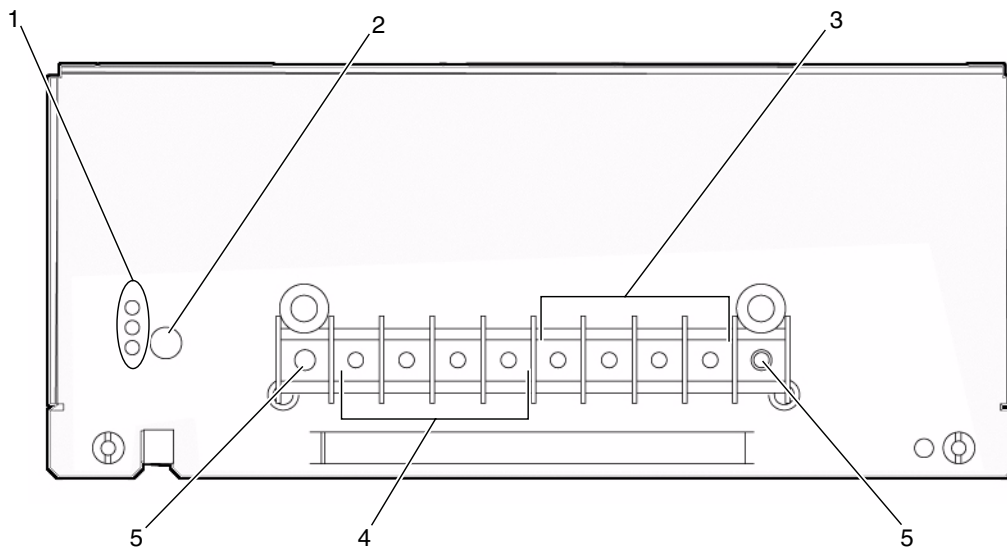


Figure Legend [FIGURE 2-21](#)

Callout	Description
1	LEDs
2	Hot-Swap button
3	RTN power terminals
4	-48V power terminals
5	Not used for electrical connections

5. Replace the terminal block covers on the power entry modules.

Make sure the terminal block cover is placed above the handle on each power entry module.

6. Complete the connection to the DC power source.

When power is first applied to the shelf, the following events occur:

- The fans go to full speed.
- All of the LEDs on the PEMs, fan trays, and SAP board turn on.
- The Ethernet LEDs on the shelf management card turn on to indicate link speed and link activity.

As the shelf management card boots, the following events occur:

- The LEDs on the SAP board turn off.
- The fans go to the initial speed setting.
- The red LEDs on the PEMs and fan trays turn off.
- The blue Hot-Swap LEDs on the PEMs, fan trays, and shelf management card blink.
- The blue Hot-Swap LEDs on the PEMs, fan trays, and shelf management card turn off.



Caution – Before working on the shelf, disconnect power from the DC power sources. When the shelf is powered on, do not touch the power entry module terminal posts.

Installing Additional Cards

If you have any additional boards to install in the server, follow the instructions in this chapter. If you do not have any additional boards to install, go to [Chapter 4](#).

This chapter includes the following topics:

- [Section 3.1, “Antistatic Precautions” on page 3-1](#)
- [Section 3.2, “Installing the Cards” on page 3-1](#)

3.1 Antistatic Precautions

Before you can install any additional cards into your system, you must first take the necessary antistatic precautions.

ESD ground jacks are located at the front and rear of the system. To protect system components from static shock when handling them, wear a wrist strap plugged into a ESD jack. Refer to [FIGURE 2-2](#) and [FIGURE 2-3](#) for the locations of the ESD ground jacks.

3.2 Installing the Cards

If you are installing additional cards in a *rear-access* model Sun Netra CT 900 server, you should first install the rear transition module at the rear of the server, and then install the front card in the front of the server. Even though you install the rear transition module first, it might be useful to look at the front of the server and locate the slot number where you will be installing the cards. Then go to the back of the server and install the rear transition module in that particular slot. Note that you can



Caution – An energy and cooling hazard is present if any slots are left uncovered. If you remove a card from a slot, you must either fill the slot with a replacement card or cover it with a filler panel.

3.2.1 Installing Rear Transition Modules

1. **Verify that you have taken the necessary antistatic precautions.**

See [Section 3.1, “Antistatic Precautions”](#) on [page 3-1](#) for those instructions.

2. **Go to the rear of the system and choose an appropriate slot for the rear transition module.**

Rear transition modules must be installed inline behind the accompanying front board. For example, if the accompanying front board is going to be installed in slot 3, its rear transition module must be installed at the back of the system in slot 3.

3. **Remove the slot filler panel from the selected node board slot, if necessary.**

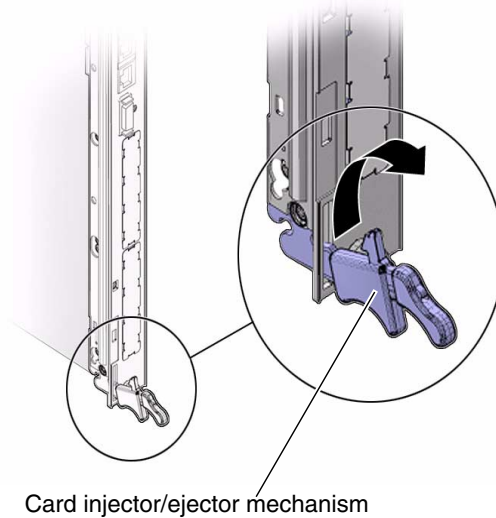
4. **Get the rear transition module from the ship kit.**

5. **Perform any card-specific hardware procedures, if necessary.**

Refer to the documentation that you received with the card for more information.

6. **Prepare the card by opening the injector/ejector mechanisms at the top and bottom of the card ([FIGURE 3-2](#)).**

FIGURE 3-2 Card Injector/Ejector Mechanism (Open Position)



7. **Carefully align the edges of the card with the card guides in the appropriate slot.**

It might be helpful to look into the enclosure to verify correct alignment of the rails in the guides.

8. **Taking care to keep the board aligned in the guides, slide the card in until the injector/ejector mechanisms engage the retention bars.**
9. **Simultaneously push in the board and rotate the injector/ejector mechanisms inward to their closed positions to seat the midplane connectors.**
10. **Tighten the board retention screws to ensure the board is secured into the shelf.**
11. **Install the front node card into the shelf.**

Go to [Section 3.2.2, “Installing Node Cards”](#) on page 3-4 for those instructions.

3.2.2 Installing Node Cards

1. **Go to the front of the system and locate the card slot where you installed the rear transition module at the rear of the system.**
2. **Remove the filler panel, if necessary.**

The filler panel is secured to the card cage using two screws—one at the top of the filler panel, the other at the bottom. Store the filler panel in a safe place; you might need to use it again if you have to remove a card for an extended period of time.

3. **Get the node card that you want to install in the Sun Netra CT 900 server from the ship kit.**
4. **Perform any card-specific hardware procedures, if necessary.**
Refer to the documentation that you received with the card for more information.
5. **Prepare the board by opening the injector/ejector mechanisms (FIGURE 3-2).**
6. **Carefully align the edges of the board with the card guides in the appropriate slot.**
It might be helpful to look into the enclosure to verify correct alignment of the rails in the guides.
7. **Taking care to keep the board aligned in the guides, slide the board in until the injector/ejector mechanisms engage the retention bars.**
8. **Simultaneously push in the board and rotate the injector/ejector mechanisms inward to their closed positions to seat the midplane connectors.**
If system power is on, the node board Hot-Swap LED should light up. The Hot-Swap LED should blink for several seconds, and then go off. If the Hot-Swap LED does not go off after several seconds, push harder on the injector/ejector handles to verify that they are pushed in all the way.
9. **Tighten the board retention screws to ensure the board is secured into the shelf.**

Cabling the System

This chapter provides pinouts for each port on the cards in the Sun Netra CT 900 server. Most of the software for each of the cards can be run through the serial port on each card, so if you are unsure where to begin, connect a cable to these serial ports on the following cards:

- Shelf alarm panel—Serial connector to the primary (top) shelf management card.
- Switch—Serial management port.

This chapter includes the following topics:

- [Section 4.1, “Connecting the Cables to the Shelf Alarm Panel” on page 4-2](#)
- [Section 4.2, “Connecting Cables to Switches” on page 4-6](#)
- [Section 4.3, “Connecting Cables to Sun Netra CP3240 Switches” on page 4-14](#)
- [Section 4.4, “Connecting Cables to the Node Boards” on page 4-14](#)



Caution – The intra-building port(s) of the equipment or subassembly is suitable for connection to intrabuilding or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly **MUST NOT** be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

4.1 Connecting the Cables to the Shelf Alarm Panel

Note – There are no cable connections to the shelf management cards. Each shelf management card has an Ethernet port that is *not* utilized by the user; instead, Ethernet traffic from the shelf management card is routed to the Ethernet ports on the switches. Serial and telco alarm traffic from the shelf management card are routed to the ports and LEDs on the shelf alarm panel. Refer to [Section 4.1, “Connecting the Cables to the Shelf Alarm Panel”](#) on page 4-2 and [Section 4.2, “Connecting Cables to Switches”](#) on page 4-6 for more information.

The shelf alarm panel on the Sun Netra CT 900 server provides connectors for the serial console interfaces of the shelf management cards and the telco alarm.

FIGURE 4-1 Shelf Alarm Panel Front Panel Components

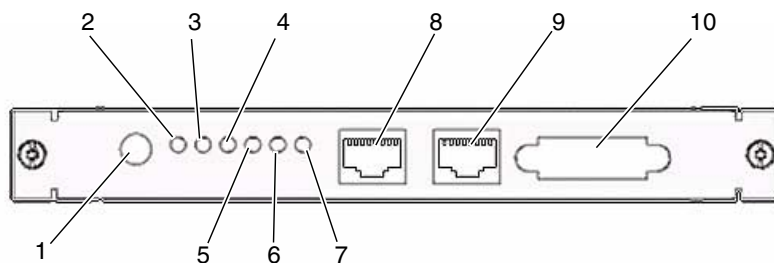


Figure Legend [FIGURE 4-1](#)

Callout	Description
1	Alarm Silence push button
2	Critical Telco Alarm LED
3	Major Telco Alarm LED
4	Minor Telco Alarm LED
5	User LED 1
6	User LED 2
7	User LED 3

Figure Legend [FIGURE 4-1](#) (Continued)

Callout	Description
8	Serial console connector for primary (top) shelf management card
9	Serial console connector for backup (lower) shelf management card
10	Telco alarm connector

To view the pinouts for each of the ports on the shelf alarm panel, see:

- [Section 4.1.1, “Serial Connectors”](#) on page 4-3
- [Section 4.1.2, “Telco Alarm Connector”](#) on page 4-5

4.1.1 Serial Connectors

The serial console connectors to the primary and backup shelf management cards use standard RJ-45 connectors. The serial consoles are normally configured for 115200 baud, no parity, 8 data bits, and one stop bit.

Note – You must use shielded cables when connecting to either of the serial ports on the shelf alarm panel.

[FIGURE 4-2](#) shows the RJ-45 serial connector pinouts and [TABLE 4-1](#) gives the RJ-45 port signals.

FIGURE 4-2 RJ-45 Serial Connector Diagram

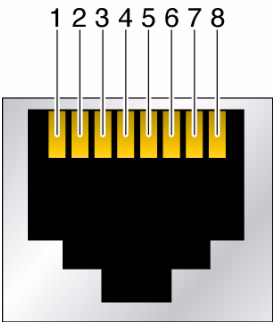


TABLE 4-1 RJ-45 Port Pinouts

Pin No.	RS-232 Signal	Shelf Management Card Signal	Type	Description
1	RTS	RTS	Out	Request to Send
2	DTR	DTG	Out	Data Terminal Ready
3	TxD	TXD0	Out	Transmit Data
4	GND	GND	---	Logic Ground
5	GND	GND	---	Logic Ground
6	RxD	RXD0	In	Receive Data
7	DSR	DSR	In	Data Set Ready
8	CTS	CTS	In	Clear to Send

FIGURE 4-3 shows the connector pinouts for the RJ-45 and DB-9 connectors. Note that connectors are viewed with the cable going away from you.

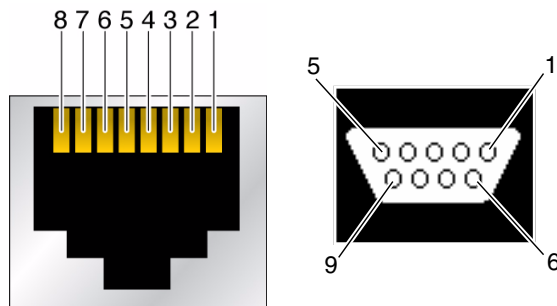
FIGURE 4-3 Serial Console Cable Connector Pin Numbering

TABLE 4-2 gives the information necessary to create a console cable to convert the RJ-45 serial console connectors on the shelf alarm panel to DB-9 connectors, if necessary.

TABLE 4-2 Shelf Alarm Panel Serial Console Cable

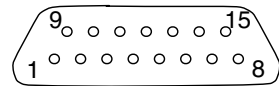
RJ-45 pin	RJ-45 Signal Name	PC 9 pin D-Sub Female	Signal Name
1	RTS	8	CTS
2	DTR	6	DSR
3	TxD	2	RX

TABLE 4-2 Shelf Alarm Panel Serial Console Cable (*Continued*)

RJ-45 pin	RJ-45 Signal Name	PC 9 pin D-Sub Female	Signal Name
4	GND	5	Ground
5	GND		
6	RxD	3	TX
7	DSR	4	DTR
8	CTS	7	RTS

4.1.2 Telco Alarm Connector

The telco alarm connector on the shelf alarm panel uses a standard Micro-DB-15 connector.

FIGURE 4-4 DB-15 Connector Diagram

[TABLE 4-3](#) gives the pinouts for the telco alarm port.

TABLE 4-3 Telco Alarm Port Pinouts

Pin No.	Signal	Description
1	AMIR+	MinorReset+
2	AMIR-	MinorReset-
3	AMAR+	MajorReset+
4	AMAR-	MajorReset-
5	ACNO	CriticalAlarm - NO
6	ACNC	CriticalAlarm - NC
7	ACCOM	CriticalAlarm - COM
8	AMINO	MinorAlarm - NO
9	AMINC	MinorAlarm - NC
10	AMINCOM	MinorAlarm - COM3
11	AMANO	MajorAlarm - NO
12	AMANC	MajorAlarm - NC

TABLE 4-3 Telco Alarm Port Pinouts (*Continued*)

Pin No.	Signal	Description
13	AMACOM	MajorAlarm - COM
14	APRCO	PwrAlarm - NO
15	APRCOM	PwrAlarm - COM
-	Gnd	Not used

4.2 Connecting Cables to Switches

The Sun Netra CT 900 server is available both as a front-access and a rear-access server. For rear-access servers, there are no active components on the rear transition module, so you must have the accompanying switch installed in the same slot at the front of the server, even though no cables will be connected to that front card.

[FIGURE 4-5](#) shows the location of the ports on the switch, and [FIGURE 4-6](#) shows the location of the ports on the rear transition module for the switch.

FIGURE 4-5 Ports and LEDs on the Switch

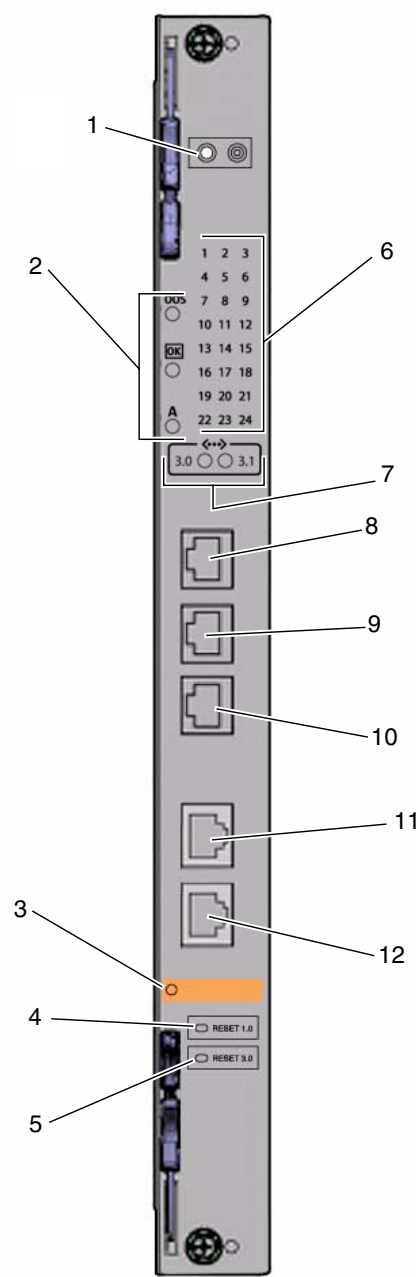


Figure Legend [FIGURE 4-5](#)

Callout	Description
1	LED Select push button
2	ATCA Status LEDs
3	Hot-Swap LED
4	Fabric gigabit Ethernet push button reset
5	Base push button reset
6	Port Status LEDs
7	Current Selected Switch LEDs
8	Fabric gigabit Ethernet 10/100/1000BASE-T port
9	Base 10/100/1000BASE-T port
10	Base 10/100BASE-TX management port
11	Fabric gigabit Ethernet serial management port
12	Base serial management port

FIGURE 4-6 Ports on the Rear Transition Module for the Switch

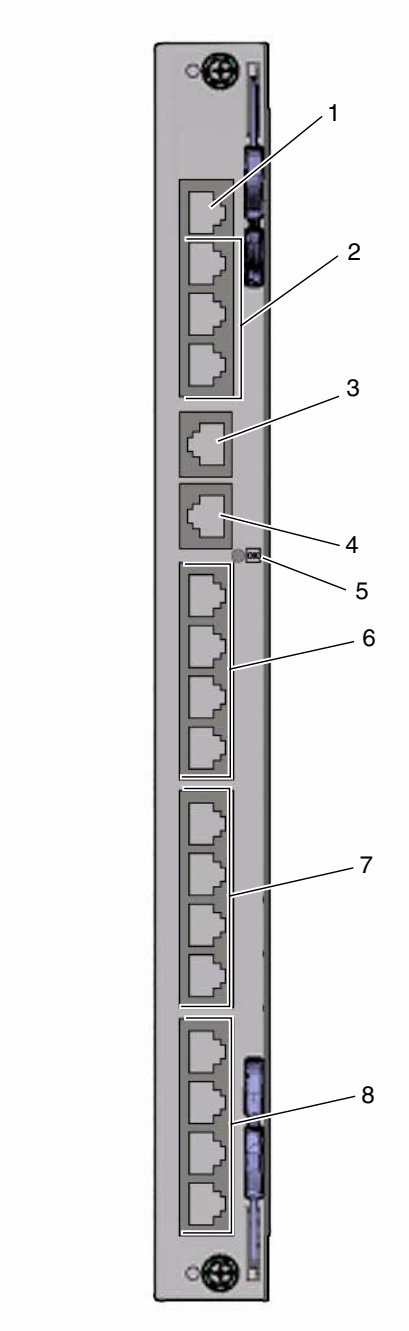


Figure Legend [FIGURE 4-6](#)

Callout	Description
1	Base and Fabric gigabit Ethernet 10/100BASE-TX management port
2	Base 10/100/1000BASE-T ports 18-20
3	Base serial management port
4	Fabric gigabit Ethernet serial management port
5	Power LED
6	Base 10/100/1000BASE-T ports 21-24
7	Fabric gigabit Ethernet 10/100/1000BASE-T ports 17-20
8	Fabric gigabit Ethernet 10/100/1000BASE-T ports 21-24

To view the pinouts for each of the ports on the switch, see:

- [Section 4.2.1, “10/100/1000BASE-T Ports” on page 4-11](#)
- [Section 4.2.2, “Base 10/100BASE-TX Management Port ” on page 4-12](#)
- [Section 4.2.3, “Fabric Gigabit Ethernet and Base Serial Management Ports” on page 4-12](#)

4.2.1 10/100/1000BASE-T Ports

The Fabric gigabit Ethernet 10/100/1000BASE-T and Base 10/100/1000BASE-T Ethernet uplink ports on the switch use standard RJ-45 connectors.

The Base 10/100/1000BASE-T port is port number 17 on the Base network. The Base 10/100/1000BASE-T port is mutually exclusive with the second ShMC port. That is, if the ShMC cross-connection is being used, this port goes to the second ShMC and not the faceplate of the switch.

The Fabric gigabit Ethernet 10/100/1000BASE-T port is port number 16 on the Fabric network.

FIGURE 4-7 shows the pinouts for the 10/100/1000BASE-T ports.

FIGURE 4-7 10/100/1000BASE-T Ports Connector Diagram

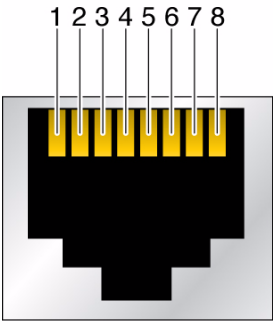


TABLE 4-4 gives the signals for the 10/100/1000BASE-T ports.

TABLE 4-4 10/100/1000BASE-T Port Pinouts

Pin No.	Signal	Pin No.	Signal
1	MDI_0+	5	MDI_2-
2	MDI_0-	6	MDI_1-
3	MDI_1+	7	MDI_3+
4	MDI_2+	8	MDI_3-

4.2.2 Base 10/100BASE-TX Management Port

The Base 10/100BASE-TX management port uses a standard RJ-45 connector. This port can be used to manage the Base and Fabric. This port and the 10/100 management port on the rear transition module can be used at the same time.

FIGURE 4-8 shows the pinouts for the 10/100BASE-TX management ports.

FIGURE 4-8 Base 10/100BASE-TX Management Port Connector Diagram

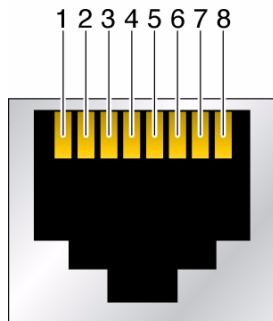


TABLE 4-5 gives the pinout information for the 10/100BASE-TX management port.

TABLE 4-5 10/100BASE-TX Management Port Pinouts

Pin No.	Signal	Pin No.	Signal
1	Tx+	5	Unused
2	Tx-	6	Rx-
3	Rx+	7	Unused
4	Unused	8	Unused

4.2.3 Fabric Gigabit Ethernet and Base Serial Management Ports

The Fabric gigabit Ethernet serial port and Base serial port on the switch use standard RJ-45 connectors. Note that the front serial port and rear transition module serial port are actually the same port. Only one of the interfaces can be used. Jumpers E7 and E8 can be used to steer the port out the front or out the back, or to allow software to control the direction.

FIGURE 4-9 shows the pinouts for the Fabric gigabit Ethernet serial port and Base serial port.

FIGURE 4-9 Fabric Gigabit Ethernet and Base Serial Ports Connector Diagram

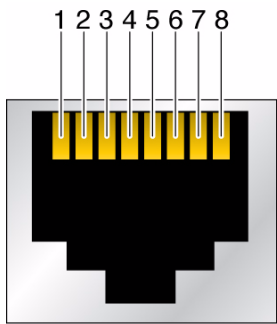


TABLE 4-6 gives the pinout information for the Fabric gigabit Ethernet serial port and Base serial port.

TABLE 4-6 Fabric Gigabit Ethernet and Base Serial Port Pinouts

Pin No.	Signal	Pin No.	Signal
1	RTS~	5	GND
2	DTR	6	RXD
3	TXD	7	DSR
4	GND	8	CTS~

TABLE 4-7 gives the minimum crossover cable pinouts needed to create a special cable or adapter to convert the serial ports' RJ-45 connectors on the switch to the more standard DB-9 connectors.

TABLE 4-7 Serial Port Pinouts

	RJ-45	DB-9
RXD to TXD	6	3
TXD to RXD	3	2
GND to GND	5	5

4.3 Connecting Cables to Sun Netra CP3240 Switches

For instructions on connecting cables to the Sun Netra CP3240 switch, refer to the switch product documentation. All of the documentation for the Sun Netra CP3240 switch is provided separately. Please refer to the following table for a list of the documentation for this product. The online documentation is available at:

<http://docs.sun.com/app/docs/prod/cp3240.switch?l=en#hic>

Application	Title	Part Number	Format	Location
Latest information	<i>Sun Netra CP32X0 Product Notes</i>	820-3260	PDF	Online
Pointer to documents	<i>Sun Netra CP3240 Switch Getting Started Guide</i>	820-3254	Printed	Shipping Kit
Usage	<i>Sun Netra CP3240 Switch User's Guide</i>	820-3252	PDF	Online
Reference	<i>Sun Netra CP3240 Switch Software Reference Manual</i>	820-3253	PDF	Online
Safety	<i>Sun Netra CP3X20 Switch Safety and Compliance Manual</i>	820-3505	PDF	Online

4.4 Connecting Cables to the Node Boards

Refer to the documentation that came with your node board for cabling instructions for that board.

Installing and Using the Software

This chapter includes the following topics:

- [Section 5.1, “Connecting a Terminal Console to the Sun Netra CT 900 Server”](#) on page 5-1
- [Section 5.2, “Installing and Using the Operating System Software on the Node Board”](#) on page 5-3
- [Section 5.3, “Using the System Management Software”](#) on page 5-3
- [Section 5.4, “Using the Switch Software”](#) on page 5-5

5.1 Connecting a Terminal Console to the Sun Netra CT 900 Server

You can access the Sun Netra CT 900 server either remotely, by logging in to the Sun Netra CT 900 server as superuser through another server on the network, or directly, by connecting a terminal console directly to your Sun Netra CT 900 server. A terminal console can be an ASCII terminal, workstation, or PC laptop.

You can administer your Sun Netra CT 900 server or specific boards directly through the serial port on the following boards:

- The shelf alarm panel
- The switch
- The node board

Refer to [Chapter 4](#) for more information on the serial port for each of these boards.

1. **Get the appropriate cables and adapters and make the necessary connections.**

2. **Access the Set Up Menu of the ASCII terminal and bring up the Serial Communications section.**

3. **Set up the serial port communications parameters.**

The default settings should match the values reported on the host serial port.

Following are the default settings for the serial port on the shelf alarm panel:

- No parity
- 115200 baud
- 1 stop bit
- 8 bit data

Following are the default settings for the serial port on the switch:

- No parity
- 9600 baud
- 1 stop bit
- 8 bit data

Refer to the documentation that came with your node board for the default settings for the serial port on that board.

4. **Test the connection.**

- For the shelf alarm panel, enter the following to verify that communication has been established to the server and the keyboard and display of the ASCII terminal:

```
# tip -115200 /dev/ttya
```

- For the switch, enter the following to verify that communication has been established to the server and the keyboard and display of the ASCII terminal:

```
# tip -9600 /dev/ttya
```

5.2 Installing and Using the Operating System Software on the Node Board

Any node boards installed in the Sun Netra CT 900 server require board-specific operating systems. Some versions of the Sun ATCA node boards might have a PCI Mezzanine card (PMC) disk pre-installed on the node board, and a version of the Solaris OS pre-installed on that PMC disk. Refer to the documentation that you received with your node board for more information. In addition, refer to the *Sun Netra CT 900 Server Product Notes* to determine if any patches must be installed for your operating system.

If your Sun ATCA node board has the Solaris OS pre-installed on the PMC disk, enter the following command to boot the node board from that operating system:

```
ok boot /pci@1e,600000/ide@4/disk@0,0 -rv
```

You might also be able to install a different version of the operating system onto the node board, if necessary, or you might boot the node board over the net or through the Compact Flash card on the node board. Refer to your node board documentation for more information.

5.3 Using the System Management Software

The system management software is actually firmware that is pre-installed on the shelf management cards. No additional software installation is necessary for those cards. You access the system management software through the shelf alarm panel. Refer to [Section 4.1, “Connecting the Cables to the Shelf Alarm Panel”](#) on page 4-2 for information on connecting to the shelf alarm panel.

Following are some basic software commands for the system management software; for more detailed procedures and information, refer to the *Sun Netra CT 900 Server Administration and Reference Manual*.

The default TCP/IP for the primary shelf management card is 192.168.0.2.

- **To log in to the default user account for the first time, root is the login and there is no password:**

```
sentry login: root
Password: (none, hit Return)
```

- To change the IP address of the primary shelf management card, enter:

```
clia setlanconfig channel parameter-number value
```

For example:

```
clia setlanconfig 1 3 192.168.0.10
```

- To list the boards in the Sun Netra CT 900 server, enter:

```
clia board
```

- To list the Intelligent Platform Management controllers (IPMCs) in the Sun Netra CT 900 server, enter:

```
clia ipmc
```

- To change the fan speed for a fan tray in the Sun Netra CT 900 server, enter:

```
clia setfanlevel IPMI-address FRU-id speed
```

Note that the value for the speed can go from 2 to 15. For example, to change the speed to 5 on a fan tray with an Intelligent Platform Management Interface (IPMI) address of 0x20 and a FRU ID of 3, enter:

```
clia setfanlevel 20 3 5
```

- To display the FRU information in a board, enter:

```
clia fruinfo IPMI-address FRU-id
```

For example, to list the FRU information in a board with an IPMI address of 0x82 and a FRU ID of 0, enter:

```
clia fruinfo 82 0
```

- To display the shelf manager firmware version, enter:

```
clia version
```

- To display the contents of the System Event Log (SEL), enter:

```
clia sel
```


- To clear the System Event Log, enter:

```
clia sel clear
```

- To list the sensors on a board, enter:

```
clia sensor IPMI-address
```

For example, to list the sensors on a board with an IPMI address of 0x82, enter:

```
clia sensor 82
```

- To get the data from a sensor on a board, enter:

```
clia sensor IPMI-address sensor-number
```

For example, to get the data from sensor 4 on a board with an IPMI address of 0x82, enter:

```
clia sensor 82 4
```

5.4 Using the Switch Software

The switch software is firmware that is pre-installed on the switches, so no additional software installation is necessary for those boards. You access the switch software through the switch. Refer to [Section 4.2, “Connecting Cables to Switches” on page 4-6](#) for information on connecting to the switch.

Following are some basic software commands and information for the switch software; for more detailed procedures and information, refer to the *Sun Netra CP3140 Switch Software Reference Manual* (819-3774) or the *Sun Netra CP3240 Switch Software Reference Manual* (820-3253).

5.4.1 Software Components

The switch software is built upon three main components:

- uBoot, which is the boot loader for the system. It can be compared to a BIOS on a node board. See [Section 5.4.1.1, “uBoot Software” on page 5-6](#) for more information.

- The operating system. The switch runs on Monta Vista 3.1 Pro, which is based on the 2.4.20 Linux kernel. See [Section 5.4.1.2, “Linux Operating System”](#) on page 5-8 for more information.
- The FASTPATH software, which provides all of the management and control features of the switch. See [Section 5.4.4, “FASTPATH Software”](#) on page 5-13 for more information.

The first two software components are covered in detail in this chapter. FASTPATH is touched upon, but refer to the *Sun Netra CP3140 Switch Software Reference Manual* (819-3774) or the *Sun Netra CP3240 Switch Software Reference Manual* (820-3253) for more details and a complete command list for each switch.

5.4.1.1 uBoot Software

The uBoot software is the boot loader for the switch. Much like a BIOS, it brings the system to a usable state for the operating system to boot. It also performs a power-on self-test (POST) of the CPU subsystem. It can be used as a recovery console if the firmware image is corrupt or a firmware update fails. Several important environment variables are stored in uBoot, only some of which should ever be changed, namely *noekey* and *baudrate*.

uBoot Console

To get to a uBoot console, you must prevent the switch from booting into Linux. Shown here is the start of the switch boot sequence.

```
CPU:    400 MHz
DRAM:   128 MB
FLASH:  32 MB
Booting ...
```

You must press any key before `Booting ...` appears. There is only a one-second delay to press this key. Multiple key presses do not hurt.

You are presented with the uBoot prompt:

```
=>
```

[TABLE 5-1](#) shows the commands that you can execute at this point.

TABLE 5-1 uBoot Commands

Command	Description
print	Shows the current environment variables.
set	When followed by an environment variable, changes that environment variable.
save	Writes the variables to flash.

Note – You must save if you want changes to persist through a reset.

E-Keying Control in uBoot

Refer to “E-Keying” on page 5-8 for a description of E-Keying and how it is supported on the switch.

To disable E-Keying, the `noekey` environment variable is used. Simply list the ports to be disabled separated only by commas, or use the word `all` to disable E-Keying completely. For example:

```
set noekey 1,2,3,4
set noekey all
```

To re-enable E-Keying, enter the following command to clear the variable.

```
set noekey
```

After changing the environment variables, you must always save if you would like your change to persist though a reset.

Serial Baud Rate Control in uBoot

The serial baud rate can be changed from within FASTPATH, on the boot menu, or in uBoot. Only changes made in uBoot will persist through a reset. To change the baud rate in uBoot, the `baudrate` variable must be changed. Only standard baud rates are accepted.

To change the baud rate in uBoot, enter:

```
set baudrate 115200
```

After changing the environment variables, you must always save if you would like your change to persist through a reset.

5.4.1.2 Linux Operating System

The switch uses Linux as an operating system. The Monta Vista 3.1 Pro 2.4.20 kernel is used. This proven environment provides stability to the switch. There are no settings to change, and the OS is completely transparent to the end user.

E-Keying

E-Keying is implemented as a Linux driver on the switch. The CPUs for both Base and Fabric interfaces have a direct connection to the IPMI controller that is used to communicate E-Keying messages. The CPU is interrupted when an E-Keying event occurs. The driver handles these interrupts and disables ports based on the information it receives. It disables them by doing the equivalent of a shutdown command at the CLI. This disables the port at the PHY level. E-Keying can be ignored by creating a uBoot environment variable (see [“E-Keying Control in uBoot” on page 5-7](#) for more information).

ATCA LEDs

The ATCA LEDs can be turned on from several sources, one of which is a Linux driver. Both the Base and Fabric interfaces drive these LEDs. The red OOS LED is driven until FASTPATH has loaded, at which point the green Healthy LED is driven. The OOS LED signals are ORed so that if one or more are active, then the LED is on. The Healthy LED signals are ANDed. The Base and Fabric interfaces must be booted into FASTPATH, in addition to several hardware conditions that must be met for this LED to be on.

The Linux ATCA LED driver provides control over the user-defined amber LED as well. The signals for this LED are ORed. This LED is currently driven under no circumstances.

5.4.2 Boot Sequence

Following is an example of the switch boot sequence.

```
CPU:    400 MHz
DRAM:   128 MB
FLASH:  32 MB

Booting ...

Boot Menu v1.0

Select startup mode.  If no selection is made within 5 seconds,
the Switch-Router Application will start automatically...

Switch-Router Startup -- Main Menu

1 - Start Switch-Router Application
2 - Display Utility Menu
Select (1, 2):

Copying Application to RAM...done.

Starting Application...
1 File: bootos.c Line: 243 Task: 111ca6f4 EC: 2863311530
(0xxxxxxxxx)
(0 d 0 hrs 0 min 17 sec)
Switch-Router Starting...
|PCI device BCM5695_B0 attached as unit 0.
\PCI device BCM5695_B0 attached as unit 1.
Switch-Router Started!

(Unit 1)>
User:
```

The switch should take approximately 20 seconds to boot to a console and be fully functional.

5.4.2.1 Boot Utility Menu

There is a utility menu that can be used before FASTPATH boots. As seen in the preceding section, during boot, a two-option menu is displayed for five seconds. This menu enables you to access to the utility menu if you press 2 and Return.

The following screen is displayed once you enter the boot utility menu.

```
Boot Menu v1.0

Switch-Router Startup -- Utility Menu

1  - Start Switch-Router Application
2  - Load Code Update Package using TFTP
3  - Display Vital Product Data
4  - Select Serial Speed
5  - Retrieve Error Log using TFTP
6  - Erase Current Configuration
7  - Erase Permanent Storage
8  - Select Boot Method
9  - BCM Debug Shell
10 - Reboot

Select option (1-10):
```

Most of the options are self-explanatory based on their names, but some deserve further discussion.

TFTP Code Update From Utility Menu

FASTPATH can be updated from within FASTPATH itself, but you can also update it from this menu. The update image must be on a TFTP server. Supply the IP address of the TFTP server, the desired IP address of the board being updated, the gateway (if needed) and the file name. To obtain an IP address for the switch during this update, enter `dhcp` as the IP address. This begins the update and provides status information as it is updating.

Erase Current Configuration

The Erase Current Configuration option is the same as `clear config` from within FASTPATH. This option can be used if the switch is in an unknown state and you want to restore the default settings.

Erase Permanent Storage



Caution – You should never use this command.

The Erase Permanent Storage command completely erases FASTPATH, any log files, and any configurations. It does not erase uBoot or Linux. Updates can safely be installed without running this option, and configurations and log files are preserved.

Boot Method

The switch supports three boot methods:

- From the local image on the Compact Flash card
- From an image over the network
- From an image over the serial port

The default option is booting from the Compact Flash card. See [Section 5.4.3, “Network Booting” on page 5-13](#) for more information on network booting.

BCM Debug Shell

Note – This environment is provided as is, with no support.

The BCM Debug Shell option boots the Broadcom diag shell, currently SDK version 5.2.1. Several commands provided in this shell are not supported on the switch and do not work. This shell is provided mainly for debug, testing, and diagnostics purposes. This shell has many low-level tests and low-level register access. It can be used to check the integrity of particular boards. Help is provided in the shell with ?? and commands followed by a single question mark. Some commands of interest are SystemSnake, dsanity, TestList, and TestRun.

Note that ports are not numbered in the same order here as in FASTPATH. In the BCM diag shell, the ports are the actual port numbers of the chips. In FASTPATH, the port numbers have been abstracted to represent the ATCA channel numbers. [TABLE 5-2](#) maps the BCM diag shell numbers to the FASTPATH numbers.

TABLE 5-2 BCM Diag Shell to FASTPATH Mapping

Port # in BCM Debug Shell	Base Port	Fabric Port
Chip 0 port 0	13	1
Chip 0 port 1	14	2
Chip 0 port 2	15	3
Chip 0 port 3	16	4
Chip 0 port 4	12	5
Chip 0 port 5	11	6
Chip 0 port 6	10	7
Chip 0 port 7	9	8
Chip 0 port 8	8	9
Chip 0 port 9	7	10
Chip 0 port 10	6	11
Chip 0 port 11	5	12
Chip 1 port 0	4	13
Chip 1 port 1	3	14
Chip 1 port 2	2	15
Chip 1 port 3	1	16
Chip 1 port 4	17	21
Chip 1 port 5	21	22
Chip 1 port 6	22	23
Chip 1 port 7	23	24
Chip 1 port 8	24	17
Chip 1 port 9	18	18
Chip 1 port 10	19	19
Chip 1 port 11	20	20

5.4.3 Network Booting

Booting from the network can be a very useful feature. It can make firmware updates as simple and quick as rebooting the boards, and it can be used to test new firmware without losing the old firmware. As described in [“Boot Method” on page 5-11](#), network boot can be enabled or disabled from the boot utility menu. To perform a network boot, you must have a TFTP server with the firmware image and you must use the out-of-band management port.

The network boot supports DHCP to obtain an IP address. Simply use `dhcp` as the IP address when configuring network boot. The network boot uses the out-of-band management port to download the firmware image, and then frees it to be used as normal once FASTPATH boots. This enables an NMS to control the firmware revision on the switch as well as manage and control the switch functions.

5.4.4 FASTPATH Software

The switch uses FASTPATH software. FASTPATH is a software package providing the robust management needed to control a modern switch-router. FASTPATH is not covered in detail in this manual, but is covered in the *Sun Netra CP3140 Switch Software Reference Manual* (819-3774) or the *Sun Netra CP3240 Switch Software Reference Manual* (820-3253). This section serves as a quick primer on using FASTPATH on the switch.

5.4.4.1 Logins and Prompts

FASTPATH supports multiple users with different security levels. By default, there is one user (admin), with no password. In the command-line interface (CLI), Privilege mode is password-protected separately from the Default mode, but also has a default of no password.

CLI Defaults

A CLI is provided on the serial console, Telnet console, and SSH console. The serial console is always enabled. The Telnet console is enabled by default. SSH is disabled by default.

The following screen shows how to switch from the Default mode to the Privilege mode. Note that by default, there is no password for the Default and Privilege modes.

```
User: admin
Password: (none, hit Return)
```

The following screen is displayed; enter `enable` to go from Default mode to Privilege mode:

```
>enable
Password: (none, hit Return)
#
```

The prompts always show the current mode. [TABLE 5-3](#) gives a few examples.

TABLE 5-3 Examples of Mode Prompts

Prompt	Mode
>	Default mode
#	Privilege mode
(config)#	Configure mode
(interface 0/2)#	Interface 0/2 mode

SNMP Defaults

Simple Network Management Protocol (SNMP) is enabled by default. The default community string is “public”. Write access is disabled by default.

SSH and SSL/TLS Keys

The switch supports SSH for a secure CLI console as well as SSL/TLS. However, the switch cannot generate its own keys. Keys must be generated on an external system and uploaded to the switch through TFTP. Once the keys are on the switch, SSH must be enabled before it can be used.

5.4.4.2 Management Options

The switch can be controlled by a CLI or through SNMP. All management interfaces, other than serial, can be enabled or disabled, provided over both the out-of-band management port and any in-band ports, and can be limited to certain in-band ports.

CLI

The switch provides an industry-standard CLI. The CLI is provided over the serial port, Telnet, and SSH. This section describes some very basic commands. Refer to the *Sun Netra CP3140 Switch Software Reference Manual* (819-3774) or the *Sun Netra CP3240 Switch Software Reference Manual* (820-3253) for a detailed list of commands.

The CLI is mode-based. It works similarly to a console in Linux. Commands are grouped under modes, and those commands work only when the user is in the current mode. There are very few global commands. To return to one mode higher than the current mode, type `exit`. For example, to shut down port 17, you must switch to Enable mode, then Configure mode, then Interface 17 mode, and then issue the `shutdown` command. Type `exit` to return to Configure mode.

Many commands have a “no” form. The no form is used to disable the command. To re-enable port 17, once you are in the Interface 17 mode, issue the `no shutdown` command.

[TABLE 5-4](#) gives a list of basic FASTPATH CLI commands.

TABLE 5-4 Basic FASTPATH CLI Commands

Command	Function	Mode
<code>enable</code>	Switch to Privilege mode. You must be in Enable mode for most options.	Default
<code>show port all</code>	Show status of the ports.	Privilege
<code>show interface ethernet 0/x</code>	Show detailed statistics on port 0/x.	Privilege
<code>clear counters</code>	Clear all statistics.	Privilege
<code>clear config</code>	Restore the default configuration.	Privilege
<code>show running-config</code>	Show the current configuration of the switch. This shows everything that is not set to the default value. The output is a script that can be copied to a file for later use, or for another switch.	Privilege
<code>copy system:running-config nvram:startup-config</code>	Save the current configuration though a reboot.	Privilege

TABLE 5-4 Basic FASTPATH CLI Commands (*Continued*)

Command	Function	Mode
<code>serviceport protocol dhcp</code>	Use DHCP on the out-of band port. Either the serviceport or the network can use DHCP. To enable DHCP on one, you must disable it on the other. The same command works for network.	Privilege
<code>serviceport protocol none</code>	Use user-assigned IP. The same command works for network.	Privilege
<code>serviceport ip <ip> <netmask> <gateway></code>	Force an IP for serviceport.	Privilege
<code>network parms <ip> <netmask> <gateway></code>	Force an IP for network.	Privilege
<code>show network</code>	View the in-band management settings.	Privilege
<code>show serviceport</code>	View the out-of-band management settings.	Privilege
<code>serial baudrate</code>	Change the serial baudrate.	Privilege
<code>vlan database</code>	Switch to Vlan Database mode. Create and delete VLANs here.	Privilege
<code>vlan x</code>	Create a VLAN with number x.	Vlan
<code>exit</code>	Return to one mode higher.	
<code>configure</code>	Switch to Configure mode. You must be in Configure mode to change most settings.	Privilege
<code>interface 0/x</code>	Switch to Interface mode. You must be in Interface mode to change most port-specific settings.	Configure
<code>vlan participation include x</code>	Add interface to VLAN x.	Interface
<code>vlan pvid x</code>	Change interface's pvid to VLAN x.	Interface

5.4.4.3 Default Settings

The switch comes configured with a default configuration. This configuration boots the board to Layer 2 switching. This configuration is very basic and should be updated for your environment. The default settings are basically that every port is in VLAN 1, every port is configured in switching mode, management interfaces are enabled, and everything else is disabled.

The settings of the switch can be checked with the `show running-config` command. This command shows how the current configuration is different from the default configuration. This command can be very useful because the output is in script format. This output can be backed up or copied to another switch.

5.4.4.4 Port Ordering

The ports are ordered the same way as the ATCA channels. In the Sun Netra CT 900 server from Oracle, the logical slots and physical slots do not match. The switch supports an abstraction layer that allows the port order to be changed. This enables vendors to match logical slots and physical slots independent of routing.

TABLE 5-5 shows the port ordering.

TABLE 5-5 Port Ordering

Shelf Physical Slot	Base Port	Fabric Port
1	13	12
2	11	10
3	9	8
4	7	6
5	5	4
6	3	2
7	Switch	Switch
8	2	1
9	4	3
10	6	5
11	8	7
12	10	9
13	12	11
14	14	13
15	15	14
16	16	15
Shelf management card	1 (or first half of 1)	None
Shelf management card	None (or second half of 1)	None

5.4.4.5 Resource Usage

The switch has two powerful CPU complexes to control and manage all the operations of the board. These complexes feature plenty of head room for custom software development and future upgrades.

FASTPATH and Linux use only approximately 56 Mbytes of the 128 Mbytes of memory. This memory is allocated at boot time and is independent of switch load. CPU usage is on the order of 1-15 percent, and is on the low end of that range most of the time. It is mostly management features that require the CPU cycles. All program files are stored compressed on the Compact Flash card and are decompressed into memory on boot. Only 12 Mbytes of the available 32 Mbytes are needed to store uBoot, Linux, and the current version of FASTPATH.

Glossary

Knowledge of the following terms and acronyms is useful in the administration of the Sun Netra CT 900 server.

A

ATCA (Advanced Telecom Computing Architecture) Also referred to as AdvancedTCA. A series of industry standard specifications for the next generation of carrier grade communications equipment. AdvancedTCA incorporates the latest trends in high speed interconnect technologies, next generation processors, and improved reliability, manageability and serviceability, resulting in a new blade (board) and chassis (shelf) form factor optimized for communications at the lowest cost due to standardization.

B

backup shelf management card	Any shelf management card capable of assuming support for the shelf manager function.
Base channel	A physical connection within the Base interface composed of up to four differential signal pairs. Each Base channel is the endpoint of a slot-to-slot connection within the base interface.
Base switch	A switch that supports the Base interface. A Base switch provides 10/100/1000BASE-T packet switching services to all node boards installed in the shelf. In the Sun Netra CT 900 server, the Base switches reside in

physical slots 7 and 8 (logical slots 1 and 2) in the shelf and support connections to all node slots and boards. Boards that support the Fabric interface and Base interface are also referred to as “switches.”

Base interface

An interface that is used to support 10/100 or 1000BASE-T connections between node boards and switches in a shelf. Midplanes are required to support the Base interface by routing four different signal pairs between all node board slots and each switch slot (in the Sun Netra CT 900 server, the Base switch slots are physical slots 7 and 8, logical slots 1 and 2).

D

data transport interface

A collection of point-to-point interfaces and bused signals intended to provide interconnect among the payloads on switches and node boards.

Dual Star topology

An interconnect fabric topology in which two switch resources provide redundant connections to all end points within the network. A pair of switches provide redundant interconnects between node boards.

E

**Electronic Keying or
E-Keying**

A protocol used to describe the compatibility between the Base interface, Fabric interface, update channel interface, and synchronization clocks connections of front boards.

ETSI

European Telecommunications Standards Institute.

F

Fabric channel

A Fabric channel is comprised of two rows of signal pairs for a total of eight signal pairs per channel. Thus, each connector supports up to five channels available for board to board connectivity. A channel may also be viewed as being comprised of four 2-pair ports.

Fabric interface

A Zone 2 interface that provides 15 connections per board or slot, each comprising up to 8 differential signal pairs (channels) supporting connections with up to 15 other slots or boards. Midplanes can support the Fabric interface in a variety of configurations including Full Mesh and Dual Star topologies. Boards that support the Fabric interface can be configured as

	<p>fabric node boards, fabric switches, or mesh-enabled boards. Board implementations of the Fabric interface are defined by the PICMG 3.x subsidiary specifications.</p>
field-replaceable unit (FRU)	<p>From a service point of view, the smallest irreducible elements of a server. Examples of FRUs are disk drives, I/O cards, and power entry modules. Note that a server, with all of its cards and other components, is not a FRU. However, an empty server is a FRU.</p>
frame	<p>A physical or logical entity that can contain one or more shelves. Also called a rack, or, if enclosed, a cabinet.</p>
front board	<p>A board that conforms to PICMG 3.0 mechanicals (8U x280mm), including a PCB and a panel. A front board connects with the Zone 1 and Zone 2 midplane connectors. It can optionally connect with a Zone 3 midplane connector or directly to a rear transition module connector and is installed into the front position in the shelf.</p>
Full channel	<p>A Fabric channel connection that uses all eight differential signal pairs between end-points.</p>
Full Mesh topology	<p>A Full Mesh configuration that can be supported within the Fabric interface to provide one dedicated channel of connectivity between each pair of slots within a shelf. Full Mesh-configured midplanes are capable of supporting mesh-enabled boards or switches and node boards installed in a Dual Star arrangement.</p>

H

hot-swap	<p>The connection and disconnection of peripherals or other components without interrupting system operation. This facility may have design implications for both hardware and software.</p>
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I

I²C	<p>Inter-integrated circuit bus. A multi-master, 2-wire serial bus used as the basis for current IPMBs.</p>
IPMB	<p>(Intelligent Platform Management Bus) The lowest level hardware management bus as described in the Intelligent Platform Management Bus Communications Protocol specification.</p>

IPMB-0 hub A hub device that provides multiple radial IPMB-0 links to various FRUs in the system. For example, an IPMB-0 hub is present in an ShMC that has radial IPMB-0 links.

IPMB-0 link With radial topology, the physical IPMB-0 segment between an IPMB-0 segment between an IPMB-0 hub and a single FRU. Each IPMB-0 link on an IPMB-0 hub is usually associated with a separate IPMB-0 sensor. An IPMB-0 link can also connect in a bused topology to multiple FRUs.

IPM controller (IPMC) The portion of a FRU that interfaces to the ATCA IPMB-0 and represents that FRU and any device subsidiary to it.

IPMI (Intelligent Platform Management Interface) A specification and mechanism for providing inventory management, monitoring, logging, and control for elements of a computer system. As defined in Intelligent Platform Management Interface specification.

L

logic ground A shelf-wide electrical net used on boards and midplanes as a reference and return path for logic-level signals that are carried between boards.

M

Mesh Enabled board A board that provides connectivity to all other boards within the midplane. Mesh Enabled boards support the Fabric interface and can also support the Base interface. Mesh Enabled boards can use 2 to 15 Fabric interface channels (typically all 15 channels) to support direct connections to all other boards in the shelf. The number of channels supported dictate the maximum number of boards that can be connected to within a shelf. Mesh Enabled boards that do not use the Base interface can be installed in the lowest available logical slot. Mesh Enabled boards supporting the Base interface can be Base switches, in which case they can support Base channels 1 and 2 and can be installed into logical slots 3 to 16. Boards supporting the Base interface use Base channels 1 and 2 only to support 10/100/1000BASE-T Ethernet.

midplane The functional equivalent of a backplane. The midplane is secured to the back of the server. The CPU card, I/O cards, and storage devices connect to the midplane from the front, and the rear transition modules connect to the midplane from the rear.

N

NEBS (Network Equipment/Building System) A set of requirements for equipment installed in telecommunications control offices in the United States. These requirements cover personnel safety, protection of property, and operational continuity. NEBS testing involves subjecting equipment to various vibration stresses, fire, and other environmental and quality metrics. There are three levels of NEBS compliance, each a superset of the preceding. NEBS level 3, the highest level, certifies that a piece of equipment can be safely deployed in an “extreme environment.” A telecommunications central office is considered an extreme environment.

The NEBS standards are maintained by Telcordia Technologies, Inc., formerly Bellcore.

node board A board intended for use in a star topology midplane that has connectivity to a switch within the midplane. Node boards can support either or both the Base interface and Fabric interface. Boards supporting the Fabric interface use Fabric channels 1 and 2. Boards supporting the Base interface use Base channels 1 and 2 only to support 10/100/1000BASE-T Ethernet.

node slot A slot in the midplane that supports only node boards. A node slot is not capable of supporting a switch, thus a node board can never occupy logical slots 1 and 2. Node slots apply only to midplanes designed to support star topologies. Node slots support both the Base interface and Fabric interface. Typically, a node slot supports two or four Fabric channels and Base channels 1 and 2. Each two channel node slots establish connections to logical slots 1 and 2, respectively. Four channel node slots establish connections to logical slots 1, 2, 3, and 4, respectively.

P

PCI (Peripheral Component Interconnect) A standard for connecting peripherals to a computer. It runs at 0–33 MHz and carries 32 bits at a time over a 124-pin connector or 0–66MHz and carries 64 bits over a 188-pin connector. An address is sent in one cycle followed by one word of data (or several in burst mode).

Technically, PCI is a synchronous bus. It includes buffers to decouple the CPU from relatively slow peripherals and allow them to operate asynchronously. You can have a local PCI bus on a board or plug in PCI cards that adhere to the PCI specification. It is not asynchronous, because all devices operate on one common clock.

physical address An address that defines the physical slot location of a FRU. A physical address consists of a site type and site number.

PICMG (PCI Industrial Computer Manufacturers Group) A consortium of companies who develop open specifications for telecommunications and industrial computing applications, including the CompactPCI standard.

R

rear-access A configuration option for the Sun Netra CT 900 server in which all of the cables come out from the back of the shelf.

rear transition module A card used only on the rear-access models of the Sun Netra CT 900 server to extend the connectors to the back of the shelf.

Reliability, Availability, Serviceability (RAS) A hardware and software feature that implements or improves the reliability, availability and serviceability of a server.

S

shelf A collection of components that consists of the midplane, front boards, cooling devices, rear transition modules, and power entry modules. The shelf was historically known as a chassis.

shelf address A variable length, variable format descriptor of up to 20 bytes in length that provides a unique identifier for each shelf within a management domain.

shelf ground A safety ground and earth return that is connected to the frame and is available to all boards.

shelf manager The entity in the system that is responsible for managing the power, cooling, and interconnects (with Electronic Keying) in an AdvancedTCA shelf. The shelf manager also routes messages between the System Manager Interface and IPMB-0, provides interfaces to system repositories, and responds to event messages. The shelf manager can be partially or wholly deployed on the ShMC or System Manager Hardware.

ShMC (Shelf Management Controller) An IPMC that is also capable of supporting the functions required of the shelf manager.

SNMP	Simple Network Management Protocol.
star topology	A midplane topology having one or more hub slots providing connectivity among the supported node slots.
switch	A board intended for use in a star topology midplane that provides connectivity to a number of node boards within the midplane. Switches can support either or both the Base interface and Fabric interface. Boards utilizing the Fabric interface typically provide switching resources to all 15 available Fabric channels. Switches supporting the Base interface are installed into logical slots 1 and 2 and use all 16 Base channels to provide 10/100/1000BASE-T Ethernet switching resources to up to 14 node boards and the other switch. One Base channel is assigned to support a connection to the shelf management card.
switch slot	In a star topology midplane, switch slots must reside in logical slots 1 and 2. Switch slots support both the Base interface and Fabric interface. Switch slots located in logical slots 1 and 2 are capable of supporting both Base interface and Fabric interface switches. Logical slots 1 and 2 are always switch slots regardless of the fabric topology. These slots support up to 16 Base channels and up to 15 Fabric channels each.
system	A managed entity that can include one or more of the following components: node and switches, shelves, and frames.

U

U	A unit of measure equal to 1.75 in. (44.45 mm).
update channel interface	Also referred to as the update channel. A Zone 2 interface that provides connections comprising of ten differential signal pairs between two boards. This direct connection between two boards can be used to synchronize state information. The transport implemented for the update channel on a board is not defined. Update channels can be used only by two like-function boards created by a single vendor. Electronic Keying is used to ensure that update channel end points have matching transport protocols mapped prior to enabling the drivers. Midplanes must support the update channel. Boards can support the update channel.

Z

Zone 1	The linear space along the height dimension of an ATCA slot that is allocated for power, management, and other ancillary functions.
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- Zone 2** The linear space along the height dimension of an ATCA slot that is allocated to the data transport interface.
- Zone 3** The linear space along the height dimension of an ATCA slot that is reserved for user-defined connections and/or interconnections to the rear transition modules for rear access systems.

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